

LG KP199



Service Manual

Table Of Contents

1. Introduction	4
2. Precautions for repair work	7
3. Unit specification	13
4. Introduction of service level	41
4-1. Service level 1	42
4-2. Service level 2	45
5. Circuit description & Exploded diagram & Circuit diagram & Device information	47
5-1. Logic block diagram & RF block diagram	48
5-2. Logic and base band portion, device information.....	49
5-3. Device Information.....	50
5-3-1. CPU (MT6226).....	50
5-3-2. PMU MT6318	54
5-3-3. Flash memory	59
5-3-4. Camera Module.....	64
5-3-5. Front End Module (Tx/Rx switch).....	66
5-3-6. Power Amp Module (pa).....	66
5-3-7. Bluetooth.....	68
5-3-8. FM (radio).....	70
5-3-9. Voice Band Interface.....	72
5-3-10. Monitor ADC.....	74
5-3-11. Battery Charging.....	75
5-3-12. REAL-TIME CLOCK (RTC).....	78
5-3-13. External interface.....	79
5-3-14. SIM interface.....	80
5-3-15. SIGNAL CONTROL Path FOR Backlight LED, Camera Flash LED and Indicator LED.....	81
5-3-16. Display system.....	82
5-3-17. RF Sub-systems (MT 6139).....	84
5-4. Circuit diagram & component diagram.....	85
6. Servicing.....	101
6-1. Structure.....	102
6-2. Accessories.....	106
6-3. Exploded diagram.....	108
7. Repairing.....	110
7-1. Testing.....	111
7-2. Trouble Shooting.....	122
7-2-1. KP199 BB Trouble Shooting.....	122
7-2-2. KP199 RF Trouble Shooting.....	154
7-3. RF Calibration / test tool (hmeta).....	168
7-4. Software download tool.....	185

AMENDMENT RECORD

AMENDMENT RECORD SHEET

Issue Number	Date
Draft 1.00	18.04.2008
Ver_1.2	26.05.2008
Ver_1.3	04.06.2008

For details of previous history refer to archival documents.

New Issue Number – Date		Changes This Issue, Page and Description	Remarks
Draft 1.0	18.04.2008	All for Publication	First draft Issue
Ver_1.2	26.05.2008	All for Publication	Second issue
Ver_1.3	04.06.2008	All for Publication	Third issue

	Next Section	>>
	Main Menu	

1




SECTION 1

Introduction

1. Introduction

The variation of “KP199” is shown below.
This Service Manual is indicated for 7339.

Variation Note.

	Product Code	Trade Name
	XXXXXXXX	KP199

This is the Electronic Service Manual for KP199 Triple Band GSM Digital Cellular Telephone from LG. It contains specific information on repair and test procedures.

For details of user functions, general operation and installation, please refer to the User Guide.

The Service Manual is set out in the following sections.

1. **Precautions for Repair Work** : provides general guidelines for undertaking safe and efficient repair work.
2. **Unit Specification**: provides the technical specifications for KP199 Triple Band GSM Digital Cellular Telephone.
3. **Introduction of Service Level** :
 - a) **Service Level 1**:describes definition of Service Level 1 , equipment and tools required for this level.
 - b) **Service Level 2** :describes definition, equipment and tools required for Service Level 2.
4. **Device Information & Circuit Description**: provides functional information and pin-outs of most of the semiconductor devices within the HHP. provides functional details of the circuits, block diagrams and component purpose descriptions.
5. **Servicing** : defines the jigs, fixtures and test configurations required for servicing the product; and describes the processes of assembly and disassembly.
6. **Troubleshooting** : provides an aid to fault finding the product. Includes, using the signal levels and plots at various parts of the circuit. Introduce how to use service tool to apply the calibration, SW download ,list the spare parts for service center.

	Next Section	>>
	Main Menu	

SECTION 2

***Precautions
for Repair Work***

Important

Please read the following cautions, notes and warnings before progressing through this manual or undertaking any repair action.

Remember: SAFETY FIRST!

CAUTION:

AC Power Cord:

Care must be taken not to damage the AC power cord as fire or electric shock may result.

Battery Pack:

Only use the specified batteries and chargers with this equipment.

Do not short the battery terminals together.

Keep the battery pack away from fire and sources of ignition.

Remember to recharge the battery pack after each use.

Before Powering up the Equipment:

- Only switch on the telephone's power once the test or installation set-up is complete.
- Switching on at the wrong time may result in electric shock or damage to system components.
- Always ensure that the power is switched off before making connections / disconnection's.
- It is important to check that the correct DC voltage is applied to the equipment to prevent electrical damage.

Component Polarity:

Always check the polarity of connections and components before soldering.

Particular attention must be paid to IC.s, diodes, transistors, capacitors and any other semiconductor device that is polarity dependent.

Electrostatic Damage (ESD):

Semiconductor devices are easily damaged by electrostatic discharge. Many of the procedures detailed in this manual involve disassembly of the equipment and therefore handling of the printed circuit boards.

To protect these devices from ESD a wrist strap connected to ground must be worn. In addition to this the work surface must be covered with an anti-electrostatic mat, which should also be grounded.

If printed circuit boards are to be stored without being re-assembled into their equipment, then they must be kept in an anti-electrostatic bag.

Grounding:

Each piece of test equipment should be electrically grounded. A third (grounding) pin is provided as a safety feature. Ensure that the electrical outlet also contains this feature.

Cosmetic Protection during Repair Work:

Always ensure that the working surface is kept clean and free from abrasive materials.

The LCD is very susceptible to scratches and damage. It should be covered with clear adhesive vinyl while the equipment is disassembled.

Storage of Faulty Components:

Any components that are replaced due to failure should be kept safely in an anti-electrostatic container. NEC's Quality or Research & Development Departments may require them to make quality and reliability investigations.

No Fault Found Equipment:

In some cases the reported symptom may not be apparent. You may subject the equipment to a controlled amount of stress, vibration and temperature variation to see if the fault occurs.

Care should be taken not to apply excessive stress or vibration or extreme temperature variations as further faults may develop.

Soldering and Disordering :

The solder used is only Pb-free.

Fast, accurate and high quality soldering is required to minimize the risk of heat damage to the electronic components.

It is necessary to adjust the temperature of soldering tip to 330 degrees or less.

The soldering tip should not be in contact with components or PCB tracks for longer than 4 seconds (average). This time depends on temperature conditions of parts.

Heat the pad on the PCB and the lead, quickly apply solder, remove heat and cool.

After soldering is complete, ensure that all solder joints are of good quality - no dry joints, solder bridges, cracks or excess solder.

The majority of chip components are machine mounted using solder paste.

Removal of the solder is not sufficient for chip component removal. Each solder point must be heated simultaneously and quickly (to prevent component and PCB damage). When the solder has melted, remove the component with tweezers.

Short Circuits:

Care must be taken to avoid short circuits. Soldering, solder dust, screws, metal clippings, metal wrist watches etc. can cause short circuits on PCBs which may result in component damage.

Test Equipment Calibration:

Your test equipment should be calibrated before use. Frequent calibration is essential to ensure high quality and reliable repairs.

Cleaning:

Before cleaning ensure that the telephone is switched off and disconnected from the power source. Cleaning should be done using a soft dry cloth. If the equipment is heavily soiled a soft cloth soaked in a mild synthetic detergent diluted in water may be used.

Never use benzene or any other chemicals to clean the equipment.

RF Shielding:

It is advisable to carry out detailed measurements and repair (in particular RX) in a shielded area to minimize RF interference.

AC Adapter and Battery Charger:

The AC adapter and battery chargers are for indoor use only. Ensure that the devices are not exposed to rain or moisture

Electrical Safety:

Electrical equipment is hazardous if misused. Any repairs must be carried out with care and only by authorized personnel.

Ensure all power sources are switched off and power cords removed before undertaking any repairs.

Hazardous Waste:

The battery pack, if incorrectly disposed of, is an environmental hazard. It must be disposed of in accordance with the regulations of the country concerned.

Never dispose of the battery pack in fire or water.

Confidentiality:

The circuitry within this equipment contains several components that are regarded as company confidential. Only use LGE specified parts as replacements.

RF Injury:

To avoid RF injury, direct exposure to radio frequency energy should be avoided. In particular, exposed parts of your body (especially the eyes and face) should not come into contact with the antenna while the equipment is transmitting.

Storage Conditions:

It is recommended that the following storage conditions should be avoided to prevent damage to the equipment: -

Dusty.

Humid.

Near to magnetic equipment

In direct sunlight

Ventilation:

Repair areas should be well ventilated and fume extraction systems should be installed where necessary. Potential hazardous substances are solder fumes, flux, alcohol etc.

PCB Handling:

It is recommended that cotton gloves are worn during repair work. This is to protect your hands from chemical contamination and to protect the PCBs from fingerprints and humidity

.

SIM Card:

- Do not bend.
- Clean by using a soft dry cloth.

AUDIO Parts:

- Be careful for alien substance/oils and fats, etc. not to adhere to the terminal contact part of MIC, the receiver, the speaker.
- Be careful to handle AUDIO parts with electrostatics measures at the worker/in the working place.
- Be careful not to spend a stress on the MIC side part to the utmost.
- Be careful not to pressurize the coil joint (protection Bond part) of the receiver and speaker because they are easy of broken.
- Be careful for alien substance to approach to sound hole part of the speaker.
- Be careful sufficiently so as not to blow air with the process into the receiver, speaker/MIC sound hole. It causes sounds being small by the diaphragm transformation or vibration.

<<	Previous Section	
	Next Section	>>
	Main Menu	

SECTION 3

Unit Specifications

3. UNIT SPECIFICATION

PRODUCT FEATURES AND SPECIFICATION

Solution	MT6226	Media Tek
Type	Bar type	
Antenna Type	Internal (tri-Band with Bluetooth)	
Main Display	1.77" 128x160	
GPRS	Class 10	
MMS	Yes, 1.1	
Camera	VGA (0.3 Mega) Fixed Focus	
Battery	≥ 1,350 mAh	Pack:703654; Li-ion Cell 673450_min 1350mAh)
Audio player	Yes (support MP3, and AAC playback)	With music equalizer
FM Receiver	Yes, US/Europe band (87.5~108MHz)	
MPEG4/H.263	Yes (support 3GP)	
H.264	No (no support)	
AAC+	No	
FM as alarm	Yes	
Scheduled FM recording	Yes	
MP4 for incoming call/ power on off animation and screen saver	Yes	
Loud Speaker	Yes	
Audio player—real resuming	Yes, for MP3	
Video recording	Yes	
Memory Size	128Mb NOR Flash + 64Mb PSRAM + 512Mb NAND	
Internal NAND	512Mb NAND	User memory: More than 60 MB.
Memory Card	Micro SD	Up to 4GB (support SD 1.1/2.0 , MMC 3.2/4.0 only)
Bluetooth	Yes, version 1.2	[Note]: Support version 1.2 only
USB	Yes, slave 1.1	
IrMC	No	
WAP	Yes, 2.0	
Java	Yes	
PoC	No	
EMAIL	No	
Status LED	No	
DRM	No	
Dictionary	No	

MPEG4 caller ID	Yes	
Finger handwriting	No	
Touch Panel	No	
Caption	No	
OTA	Yes	
AB repeat	No	
Music Equalizer	Yes	
Image Editing	No	
In flight mode	Yes	

General Requirement

Category	Requirement Description	Parameter	Support
Frequency	Shall support multiple radio bands/power		
	- 900 MHz/class 4 (2W)		Y
	- 1800 MHz/class 1 (1W)		Y
	- 1900 MHz/class 1 (1W)		Y
Antenna	Shall support [Internal/External] antenna	Internal	Y
GPRS	Shall support GPRS bearer		
	- release [R#]	R99 (Based on 07A codebase)	Y
	- multi-slot class [class #]	10	Y
	- Service class [Class #]	Class B	Y
	- Coding scheme [CSn]	CS1, CS2, CS3, CS4	Y
Data Service	Shall support following data transaction mode and services.		
	- WAP [rel #]	2.0	Y
	- SMS		Y
	- EMS [rel #]	Code 5.0	Y
	- MMS [rel #]	1.1	Y
Java	Support JAVA MIDP [ver #]	2.0	Y
	Support JAVA CLDC [ver #]	1.1	Y
Voice codec Audio decoder	Shall support multiple voice codec		Y
	- FR		Y
	- EFR		Y
	- HR		Y
	- AMR NB (air link) (AMR(teleservice))		Y
	Shall support multiple audio decoders		
	- MP3		Y
	- AAC		Y
Physical	The physical dimension is [Length x Width x Thickness mm]	105*46*15mm	Y
	The overall volume is [# cc]		Y
	The weight is [# g]		Y
Display	Shall support main display with following characteristics:		Y
	- Size	1.77"	Y
	- Type	TFT, Transmissive	Y
	- Color depth	262K	Y
	- Pixel resolution [width x height]	128x160	Y

Category	Requirement Description	Parameter	Support
	- Active area [W x H mm]	28.032(W)x 35.04(H) mm	Y
Camera	Shall support high resolution camera with following characteristics:		Y
	- Active pixel array up to resolution [X x Y pixels]	640 x 480	Y
	- Sensor type [CMOS or CCD]	CMOS	Y
FM radio	Shall support FM radio bands		
	- US/Europe band	87.5~108MHz	Y
Battery	Shall support Li-Ion battery with minimum capacity of [mAh].	≥ 1,350 mAh	Y
Connectivity	Shall support following device to connect external devices.		
	- USB [ver, host or slave or OTG]	1.1 slave	Y
	- Bluetooth [ver, power class]	1.2, class 2	Y
	- Bluetooth profiles	GAP SDAP DUN SPP HSP HFP OPP FTP A2DP, AVRCP	Y
Storage	Shall support mass data storage for different multimedia content.		Y
	- Build-in NAND [MB]. Used as mobile disk. (Notes : Designed footprint shall be possible to support multiple memory capacity)		Y
	- Micro SD		Y
Indication			
Vibrator	Shall support in built vibration alert		Y
SIM Card	Shall support SIM card both 1.8V and 3V.		Y
Keypad	Shall support - 12 alphanumeric/number keys (0-9,#,*) - 4 function keys (send, end, left softkey, right softkey) - 5 way navigation keys (up, down, ok, left, right) - 3 side keys (side up, side down and camera key)		Y
	Shall support illumination color [color] for keypad backlight.	2 LEDs with Light Guide Film.	Y
	Shall design in a nub on or around key number 5.	1 or 2 Nub, depends on Final ID.	Y

Category	Requirement Description	Parameter	Support
Headset Hook switch	Idle: (unlocked) 1. Press: show the “All calls list” and the recent number is highlighted. 2. Press & hold: calling to last number of all calls list. Idle: (key lock) 1. Press: show the “All call list” and the recent number is highlighted. 2. Press & hold: calling to last number of all calls list.		Y
	Recent call list: (unlocked) 1. Press: calling to the highlighted number		Y
	Missed call: (unlocked) 1. Press: calling to the return number		Y
	In a call: 1. Press: end call 2. Press & hold: end call		Y
	In a call and another call is waiting: 1. Press: swap call 2. Press & hold: end active call		Y
	Phone lock: Press/Press & hold: no action		Y
Camera	<i>Shall support AWB (Automatic White Balance)</i>		Y
	<i>Shall support manual flicker reduction</i>		Y
	<i>Shall support gamma correction</i>		Y

Table 1 : Indication LED scenario

Performance Requirement

Category	Requirement Description	Parameter	Support
Standby Time	Shall support minimum test hours as [hrs] based on battery capacity of [mAh] (Reference measurement conditions refer to TW-09)	$\uparrow 240$ hrs @ 1350mAh (GSM900 P.P.: 52) [Please list different page rate condition]. () $\uparrow 360$ hrs @ 1350mAh (GSM900 P.P.: 5) $\uparrow 440$ hrs @ 1350mAh (GSM900 P.P.: 9) [] (Standby time = Battery Capacity*0.9 / avg. Standby current)	Y
Talk Time	Shall support minimum test minutes as [min] based on battery capacity of [mAh] (Reference measurement conditions refer to TW-09)	$\uparrow 280$ min @ 1350mAh (GSM,PCL: 5) [Please list different page rate condition]. () $\uparrow 360$ min @1350mAh @GSM900 PCL 7 [] (Talk time = Battery Capacity*0.9 / Talking current)	Y
MP3 play time	Shall support MP3 play at least for [# hrs] assume stereo headset is attached	20 hrs @ 1350mAh	Y

Category	Requirement Description	Parameter	Support
Video play time	Shall support Video play at least for [# hrs] assume stereo headset is attached	5 hrs @ 1350mAh ()	Y
Bluetooth Standby Time	Shall support minimum test hours as [hrs] based on battery capacity of [mAh]	200hrs@ Paging period: 2 ()	Y
FM Radio Current consumption	Shall support minimum current [mA]	↓40mA @Paging period: 2	Y
RTC	The real time clock shall be able to sustain for at least [#hrs] after removing the battery.	10 hrs (25 degree C)	Y
RF	The RF performance shall comply with 3GPP TS45.005. The internal/special RF performance requirement are defined as below.		Y
	<i>Shall exceed the sensitivity performance [dBm] in GSM band under conditions of static channel, extreme conditions without fading.</i>	-105dBm	Y
	<i>Shall exceed the sensitivity performance [dBm] in DCS band under conditions of static channel, extreme conditions without fading.</i>	-105dBm	Y
Antenna	<i>Shall exceed the sensitivity performance [dBm] in PCS band under conditions of static channel, extreme conditions without fading.</i>	-105dBm	Y
	Antenna performance test shall be done according to [#] standard	CTIA	Y
	The GSM TRP (Total Radiated Power), when transmitting at the maximum power, shall be no less than [dBm] (low, middle, high channel)	Free space: ↑28dBm Body: ↑21dBm	Y
	The DCS TRP (Total Radiated Power), when transmitting at the maximum power, shall be no less than [dBm] (low, middle, high channel)	Free space: ↑25dBm Body: ↑19dBm	Y
	The PCS TRP (Total Radiated Power), when transmitting at the maximum power, shall be no less than [dBm] (low, middle, high channel)	Free space: ↑25dBm (25dBm: in case of minor band) Body: ↑19dBm (18dBm: in case of minor band)	Y
	The flatness of TRP of the same band shall be within	2dB.(low, middle, high channel)	Y
	The TIS of GSM band shall be better [dBm]	Free Space: ↓-103dBm Body: ↓-97dBm	Y
	The TIS of DCS band shall be better [dBm]	Free Space: ↓ -103dBm Body: ↓-97dBm	Y





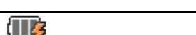



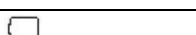
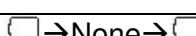




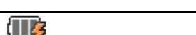



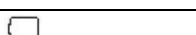
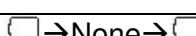




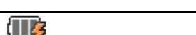



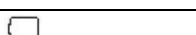
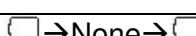
Category	Requirement Description	Parameter	Support
	The TIS of PCS shall be better [dBm]	Free Space: ↓-103dBm (-102dBm: in case of minor band) Body: ↓-97dBm (-96dBm: in case of minor band)	Y
	The flatness of TIS of the same band shall be within	2dB.(low, middle, high channel)	Y
	The SAR (Body SAR) value shall NOT exceed [W/kg] with 10g averaging	1.3	Y
Camera	Camera module shall support following top-level specification.		Y
	- <i>Sensitivity</i>	1.3V/Lux·sec	Y
	- <i>Dynamic Range</i>	52dB	Y
	- <i>FOV</i>	58° (diagonal)	Y
	- <i>Focus</i>	30cm - ∞	Y
	Shall support preview up to [resolution @fps] on main display. Note : The actual visual quality might be up to the response time of LCD.	128X160@30fps	Y
	The time spacing between two consecutive burst capture shall be less than [# sec]	The average time spacing between 2 consecutive captures should be less than or equal to 1 sec under the condition: 320x240 image size with normal quality in the light environment (outdoor, >= 20000 lux). ---(Arima will study it and try to make it being better than above spec. if there is any valid solution.)	Y
	Camera Using time should be less than 1. Camera entrance time [# sec] 2. Taking time [# sec] 3. Saving time [# sec] 4. Taking + Saving time [# sec] (in case auto saving function)	2 sec 2 sec 3 sec 3 sec	Y
	Synchronization of Shot sound and shutter	At a time	Y
	I		
Video	Shall support recording with the maximum frame rate (fps) in specific video resolution, [resolution @ # fps]	QCIF @ 15 fps	Y
	Shall support playback with the maximum frame rate (fps) in specific video resolution	QCIF @ 30 fps	Y
Display	Main display shall sustain the following specification.		Y
	- <i>Typical central Luminance</i> [# cd/m2]	200 cd/m2 @handset level, , based on LG standard	Y

Category	Requirement Description		Parameter	Support	
	- No conspicuous cross talk observed on test pattern.			Y	
	- The chromaticity of main display should be better than			Y	
		x			y
	R	0.615			0.344
	G	0.332			0.574
	B	0.149			0.103
	W	0.308	0.321		
Tolerance:+- 0.05					
	- The contrast ratio of main display should be better than [#] at normal temperature		300 (Component spec, based on LG standard)	Y	
Acoustic	Uplink audio shall be Compliant with 3GPP TS43.050 V4.00 (Referring to TS26.131 & 132)		Based on LG standard	Y	
	Downlink audio shall be Compliant with 3GPP TS43.050 V4.00 (Referring to 26.131 & 132)		Based on LG standard	Y	
	The TDD noise in downlink direction shall be better than [# dB] (Max power)		-62dBm, based on LG standard	Y	
	The TDD noise in uplink direction shall be better than [# dB] (Max power)		-62dBm, based on LG standard	Y	
Ringer Volume	At least 58 dBspl under below conditions: 1. Ringer set as ringer. 2. Test distance set as 1 m		Under 58dB : 0 %, based on LG standard ≥ 58 dB : 100% ↑ , based on LG standard ≥ 63dB : 60% ↑ , based on LG standard	Y	
Charge Current	Fast Charge (TA): Fast Charge (USB): Pre-Charge: Total Charging Time:		650 ±65 mA(Based on Friwo charger). 450 ±45 mA 50 ±15 mA ≤ 3.5 hours	Y	
Antenna Display	Antenna Bar indicator		Rx power	Y	
	5 → 4		-86dBm ± 2dB		
	4 → 3		-91dBm ± 2dB		
	3 → 2		-96dBm ± 2dB		
	2 → 1		-101dBm ± 2dB		
	1 → 0		-105dBm ± 2dB		
Battery Indicator	Battery Indicator		Voltage	Y	
	Discharge	3→2	3.782 ± 0.05V		
		2→1	3.6895 ± 0.05V		
		1→0	3.391 ± 0.05 V		
	Charge	0→1	3.833 ± 0.05 V		
		1→2	3.922 ± 0.05V		

Category	Requirement Description	Parameter	Support
	2→3	$\geq 3.922 \pm 0.05V$	
Low voltage Warning	Warning tone duration	1. In call (every 1 minute) 2. not in call(every 3 minutes)	Y
	Voltage	3.37V \pm 0.05V during call 3.36V \pm 0.05V during stand by	
Forced shut down voltage		3.35 \pm 0.03V	Y
USB	The average USB connection throughput between ME and USB should be better than [# kB/s]	RD: 600kB/s () WR: 200kB/s	Y

Software Function

Item	Target Specification
Form Factor	Bar Type
Size	105*46*15mm
Weight	
Battery	3.7V, 1350mAh
Talk Time	280 min @1350mAh @GSM900 PCL 5 (Need to calculate again-base on PCL 7); 360 min @1350mAh @GSM900 PCL 7
Standby Time	240 hrs@1350mAh @ Paging period 52
Antenna	Embedded type
LCD	262Kcolor, 128x160 TFT
FM Radio	Yes, EU/US band only
Camera	VGA Fixed Focus
Back Light	White LED
Keypad Backlight Color	Blue LED
Vibrator	Yes
Loud Speaker	Yes
Microphone	Yes
Earphone Jack	Yes
SIM Socket	Yes, 1.8/3.0V
Volume Key	Side key
Basic Accessory	Travel Adaptor
	Battery (1350mAh, Li-Ion)
	Stereo Headset with button
	USB Data Cable

Function	Target Specification																																										
Basic Display	RSSI (6 Level, 0~5)																																										
	Battery Indicator (4 Level, 0~3) (Follow LGE's standard battery charging/discharging scenario that is implemented at KP320, level defined as HW Battery Indicator)																																										
	Charging																																										
	<table><tr><th>Battery Level</th><th>Scenario</th><th>Icon</th></tr><tr><td>Under 0</td><td>Blinking of level 1</td><td></td></tr><tr><td>0 ~ 1</td><td>Blinking of level 1</td><td></td></tr><tr><td>1 ~ 2</td><td>Level 1 fixed, blinking of level 2</td><td></td></tr><tr><td>2 ~ 3</td><td>Level 1,2 fixed, blinking of level 3</td><td></td></tr><tr><td>Over 3 (full)</td><td>Level 1,2,3 fixed</td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td>Discharge</td><td></td><td></td></tr><tr><th>Battery Level</th><th>Scenario</th><th>Icon</th></tr><tr><td>3 ↑</td><td>Level 1,2,3 fixed</td><td></td></tr><tr><td>3 ~ 2</td><td>Level 1,2 fixed</td><td></td></tr><tr><td>2 ~ 1</td><td>Level 1 fixed</td><td></td></tr><tr><td>1 ~ 0</td><td>Empty battery (fixed)</td><td></td></tr><tr><td>Under 0</td><td>Blinking of empty battery</td><td></td></tr></table>	Battery Level	Scenario	Icon	Under 0	Blinking of level 1		0 ~ 1	Blinking of level 1		1 ~ 2	Level 1 fixed, blinking of level 2		2 ~ 3	Level 1,2 fixed, blinking of level 3		Over 3 (full)	Level 1,2,3 fixed					Discharge			Battery Level	Scenario	Icon	3 ↑	Level 1,2,3 fixed		3 ~ 2	Level 1,2 fixed		2 ~ 1	Level 1 fixed		1 ~ 0	Empty battery (fixed)		Under 0	Blinking of empty battery	
	Battery Level	Scenario	Icon																																								
	Under 0	Blinking of level 1																																									
	0 ~ 1	Blinking of level 1																																									
	1 ~ 2	Level 1 fixed, blinking of level 2																																									
	2 ~ 3	Level 1,2 fixed, blinking of level 3																																									
	Over 3 (full)	Level 1,2,3 fixed																																									
	Discharge																																										
	Battery Level	Scenario	Icon																																								
	3 ↑	Level 1,2,3 fixed																																									
	3 ~ 2	Level 1,2 fixed																																									
	2 ~ 1	Level 1 fixed																																									
	1 ~ 0	Empty battery (fixed)																																									
Under 0	Blinking of empty battery																																										
	Icons Indicator																																										
	Others reference to "Phone Personalization Setting"																																										
Speech Codec	FR/EFR/HR/AMR																																										
Keypad	Number of Keys: 24 Key (include 12 alphanumeric/number keys (0-9,#,*), 4 function keys, 5 way navigation keys, 3 side keys)																																										
	Soft Function Keys : 2																																										
	International Access (+)(long 0)																																										
User Profile (Audio Settings)	User Selectable and Customizable Profiles (7 profiles: General, Meeting, Outdoor, Vibrate only, Headset, Silent, Bluetooth)																																										
	Auto-detect and activated profiles (1 profile: Headset)																																										
	Key Tone																																										
	Key Tone Volume (7 Level - 0 ~ 6, 0 for Mute)																																										
	Key tone setting (4 sets: Silent, Click, Piano Tone, English/Russia Human voice)																																										
	Ring Tone																																										
	Ring Tone Volume (7 Level - 0 ~ 6, 0 for Mute)																																										
	Built-in Ring Tone Pattern: 20																																										
	Customizable Ring Tone Link: 5																																										
	Music player volume level: 7 Levels, 0~6, 0 for Mute																																										

	Intelligent Call Alert
	Digits To Sound Synthesizing
	Alert Type
	6 Types - Ring, Vibration Only, Vibration and Ring, Ring after vibration, Light Only, Beep Once
	Power On Tone
	Built-in Ring Tone Pattern: 3 (include Silent)
	Power Off Tone
	Built-in Ring Tone Pattern: 3 (include Silent)
	Message Tone
	Built-in Ring Tone Pattern: 8 (include Silent)
	Warning Tone
	Built-in Ring Tone Pattern: 1 (Only On/Off operation)
	Error Tone
	Built-in Ring Tone Pattern: 1 (Only On/Off operation)
	Camp On Tone
	Built-in Ring Tone Pattern: 1 (Only On/Off operation)
	Connect Tone
	Built-in Ring Tone Pattern: 1 (Only On/Off operation)
	Answer Mode
Personal Information Management	Any Key Answer
	Auto (Only available for headset mode while headset plugged in)
	Calendar - Month view only
Tools and Utilities	To do list - 6 fields (Date, Start time, End time, Note, Alarm, Repeat)
	Alarm
	5 sets of Alarm
	4 major fields for each set - On/Off, Time, Repeat type, Audio option
	World Clock
	Cities list: China(52),IND(54),CIS(68) cities
	Daylight saving time support: activated by user selection
	Home city set
	Calculator
	Addition, Subtraction, Multiplication, Division
	Unit Converter
	Weight, Length , Currency Converter

Phone Personalization Setting	Health
	BMI, Menstrual
	Greeting Text
	Shortcuts
	Flight Mode
	Time and Date Setting
	Wallpaper
	Screen Saver
	Power On Animation
	Power Off Animation
	LCD Backlight
	PLMN/Service Indicator (Display of PLMN Name/Service Provider Name from SIM)
	Date Time Display
	Own Number Display
	Restore Factory Default Setting
Security	Phone Lock
Input Method	Engine
	T9
	Support Language
	Depends on customer and market requirement. Total supported languages will be limited to memory condition.
	Predictive word input
Game	2 embedded games: Burster, and FaceOff (The same games as KP220)
	2 Java Games, provided by LGE.
	Settings: BGM, Sound Effect, Vibration
Timer Teller	Report the time by human voice every hour. Support English voice only.
Lost Mobile Tracking (LMT)	Provide this feature by following LG spec. (GSM_VVLT 05_LMT_20071117_1.ppt)

Function	Target Specification
GPRS	GPRS Multi slot Class 10
Data Service	BS 24 - 26 (2400-9600 bit/s), asynchronous, non-transparent, UDI. CSD rate up to 9.6K bit/s
Call History	Last Dialed Number: 40
	Last Received Number: 40
	Last Missed Number: 40
	Scratch Pad Memory (Save an input number in call): 1
Call Cost	Last Call Time
	Total Dialed Call Time
	Total Received Call Time
	Last Call Cost
	Total Cost
	Max Cost
	Price Per Unit
GPRS Counter	Last Sent (unit in Byte)
	Last Received (unit in Byte)
	All Sent (unit in Byte)
	All Received (unit in Byte)
Call Management	Call Swap
	Call Retrieve
	Automatic Redial
	Speed Dialing
	Last Number Redial
	Support 50-digits Dialing Number from Idle, Phonebook in handset, and Call Log (This feature will not be realized in KP199 project.)
Call Related Supplementary Services	Call Hold
	Call Waiting
	Calling Line Identity Presentation
	Calling Line Identity Restriction
	Connected Identification Restriction
	Call Divert All voice Calls
	Call Divert if unreachable
	Call Divert if no answer
	Call Divert if busy
	Call Divert all data calls
	Cancel all divert
	Call Barring All Outgoing Calls

	Call Barring All Outgoing International Calls
	Call Barring All outgoing International except home
	Call Barring All incoming Calls
	Call Barring All incoming Calls when roaming
	Multi-party Call (up to 7 calls, 5 in conference, 1 on held, 1 waiting)
	Line switching (Line1, Line2)
	Call reminder (Off, Single, Periodic)
	Closed User Group
Phone Book	Quick Search (Notice: Quick search function only works in Phonebook, SMS and MMS. In other application, this phone supports regular search.)
	Alpha Store and Recall
	Access Phone Book in call
	Copy & Move
	Fixed Dial Number
	Service Dial Number
	Speed Dial Number
	SOS Number
	Entry: 1000 names (12 fields – Name, Mobile, Home, Company name, Email address, Office number, Fax number, Birthday, Associate Picture, Associate Video, Associate Sound, Caller group) ---- calculate the memory usage (60KB)
	Caller Group-5 caller group- Friends, Family, VIP, Business, Others (6 fields – Name, Ring, Picture, LED pattern, Video, Member list)
	Own Numbers: User can change the own numbers of handset. (Sets of own numbers depends on SIM)
	vCard: (Edit, Send and Receive. 7 fields – Name, Mobile, Home, Company Name, Email Address, Office Number, Fax Number)
	Note: This phone doesn't support phone number search.
Message	SMS
	Standard SMS
	SMS Reply Path
	SMS Delivery Report
	Valid period (1 hour/12 hours/1 day/1 week/Maximum)
	Message Type (Text, Fax, Page, Email) Message Indication Type refer to GSM 03.40
	Basic text-only SMS as described in 3GPP TS 23.040 R5
	Notice: This phone doesn't support video ring tone via SMS
	SMS Character Sets Support
	GSM7
	UCS-2
	EMS
	EMS Standard as described in 3GPP TS 23.040 R5 excluding WVG
	EMS Text Format
	Text Style: Normal, Bold, Italic, Underlined, Strikethrough

Text Alignment: Left, Right, Center
Text Size: Normal, Large, Small
EMS Image Support
1-bit small image 16x16 pixels black and white
1-bit large image 32x32 pixels black and white
1-bit variable image in single SMS packet
Extended black and white 1-bit image up to 255x255 pixels
Extended 6-bit image up to 255x255
Pre-defined animation
User-defined small animation 8x8 pixel 4-frame black and white
User-defined large animation 16x16 pixel 4-frame black and white
Pre-defined sound
User-defined i-Melody up to 128 bytes
LZSS compression algorithm
Re-use extended object
Object Distribution
User Prompt Indicator
Hyperlink format element
Extended Object Distribution
Notice: This mobile doesn't support Nokia smart message format (including WBMP), only support *.ems format" → subject to Nokia smart message license
EMS Character Sets Support
GSM7
UCS-2
EMS Miscellaneous
SMS Concatenation (8 Segments for MT/MO)
SMS Compression
MMS
MMS Standard as described in 3GPP TS 23.140 V4.8.0
Extract media from Message
Insert Media into message
OTA provisioning partially support (Network Profile setting
Auto download mode
Manual download mode
Operator can pre-configure the delivery mode
MMS notification with icon or Pop-up message display)
MMS Message Format
MMS SMIL (A subset of SMIL descried in the MMS Conformance Document 1.2) - maximal size for each MMS is limited by300KB
MMS Character Sets Support
US-ASCII

	Unicode
	ISO-8859-1
	UTF-16
	UTF-8
	MMS Images Support
	WBMP Wireless bitmap
	GIF87
	GIF89a
	JPEG
	MMS Sound Formats Support
	WAV
	AMR
	MIDI
	MP3
	i-Melody
	MMS Miscellaneous
	Multipart binary MIME
	Storage
	Separated Inbox folder for SMS and MMS
	Separated Outbox folder for SMS and MMS
	Total 100 MMS in the phone storage including Inbox, draft and Outbox Notice: Total MMS count need depends on user memory space.
	Common Operation
	Write Message
	Read Message
	Edit Message (For MMS, Edit only conformance messages, unknown media not supported, unknown SMIL not supported)
	Reply Message
	Send Message
	Delete Message
	Forward Message
	Use Sender's Number
	Message Templates
	Extract media from Message (MMS/EMS)
	Store Media (MMS/EMS)
	Delete Media (MMS/EMS)
Cell Broadcast	Read Cell Broadcast
	Cell Broadcast Mode: Receive On/Off
	Cell Broadcast Message Language

	Channel Setting
Network	Automatic Network Selection
	Manual Network Selection
	Network Service Status
	Preferred Network (User definition)
	GPRS connection mode selection: Always, When Needed
SIM	Common Operation
	SIM Application Toolkit (Release 98 Class 2 certified)
	Prepaid SIM operation, BIP support for Turkey: MTK will support this feature by 07B codebase and temporally be discarded in this project.
	Security
	PIN
	Personalization (Service provider lock, Network lock)
DTMF	DTMF Signaling
	DTMF Enable & Disable

<Additional>

Function	Target Specification	Status	
		Code base 05C	Code base 07A
Browser	WAP	WAP2	WAP2
	wap version 2.0 / WML version : 1.3	WAP2.0 Q04C1-1/MIC 1.1.14	WAP2
	WAP 2.0+MMS+Push /	Yes	Yes
	-WML version : 1.3 xhtml version : 1.0	WML 1.3 / XHTML 1.1	WML 1.3 / XHTML 1.1
	Character sets supported in WAP browser (UTF-8 (Default), UTF-16, USASCII, Latin1, UCS2, ISO-8859-1, UTF-8, UTF-16, ISO-10646-UCS-2, USASCII)	utf-8, iso-8859-1, us-ascii, iso-10646-ucs-2	utf-8, iso-8859-1, us-ascii, iso-10646-ucs-2
	Contents Decoder	Base64, Quote-Printable	Base64, Quote-Printable
	WBMP Wireless bitmap, GIF87, GIF89a, PNG, JPEG, JPG, BMP, AMR, MIDI, MID, IMELODY, MP3, 3GP, AAC	JPG,JPEG,GIF,WBMP,BMP,PNG MP3,MIDI,MID,AMR,MMF,WAV,MPEG,MPG,AAC 3GP,MPEG4,MP4,3GPP	JPG,JPEG,GIF,WBMP,BMP,PNG MP3,MIDI,MID,AMR,MMF,WAV,MPEG,MPG,AAC 3GP,MPEG4,MP4,3GPP

Function	Target Specification
Camera	Image size: 128X160, 160X128, 320X240, 640X480
	Continuous Shot: 9 shot, 5 shot, 3 shot, OFF
	Zoom: 1x ~ 4x
	Image Quality: High, Normal, Low
	White Balance: Auto, Daylight, Tungsten, Fluorescent, Cloud, Incandescence
	Shot: Three Shot Sounds
	EV: -4 ~+4
	Screen Mode: Auto, Night
	Banding: 60Hz/50Hz
	Effect settings: (Total 14 types) Normal, Grayscale, Sepia, Sepia Green, Sepia Blue, Color Invert, Gray Invert, Blackboard, Whiteboard, Copper Carving, Blue Carving, Embossment, Contrast, Sketch
	No. of the Stick Frames: 3 Frame 1, Frame 2, None Stick Frame Only can be used while image size is 240WX320H
	Storage Selection: Phone, Memory card (Only available when external memory card supported)
	Delay timer: Off/ 5/ 10/ 15 Sec
Image Viewer	Thumbnail supported
	Browse Style: List, Matrix
	View
	Forward: To Wallpaper, Phonebook, Screen Saver, Power On Display, Power Off Display, MMS, Bluetooth
	Rename
	Delete
	Delete All
	Sort: By Name, Type, Time, Size, None

	Storage Selection: Get list from Phone, Memory card (Only available when external memory card supported)
	Image Format Support
	JPEG Baseline
	GIF87a
	GIF89a
	WBMP
	BMP
Music Player	Play
	Pause
	Resume
	Stop
	Next
	Previous
	Storage Selection: Get list from Phone, Memory card (Only available when external memory card supported)
	Auto-Generate Playlist
	Skin: 2 skins
	Repeat Mode: Off, One Song, All Songs
	Shuffle Play
	Background Play
	Equalizer Setting: 8 sets Normal, Bass, Dance, Classical, Treble, Party, Pop, Rock
	Volume Control: 7 level (0 ~ 6, 0 for Mute)
	Playlist Edit: Add, Remove, Remove All
	Sound Format Support
	MP3
	AMR
	MIDI
	WAV
	AAC
	AWB (AMR-WB)
Video Player	Play
	Pause

	Stop
	Speed Control: X1, X2, X4, X8, X1/2
	Forward: To Phonebook, Screen Saver, Power On Animation, Power Off Animation, MMS, Bluetooth
	Rename
	Delete
	Delete All
	Sort: By Name, Type, Time, Size, None
	Storage Selection: Get list from Phone, Memory card
	Volume Control: 7 level (0 ~ 6, 0 for Mute)
Video Recorder	White Balance: Auto, Daylight, Tungsten, Fluorescent, Cloud, Incandescence
	EV: -4 ~+4
	Night Mode: On/Off
	Banding: 60Hz/50Hz
	Video Quality: Fine, High, Normal, Low
	File Size Limit: No Limit, 95KB, 195KB, 295KB,
	Record Time Limit: No Limit, 15 sec, 30 sec, 60 sec
	Record Audio: On/Off
	Encode Format: MPEG4, H.263
	Effect settings: (Total 14 types) Normal, Grayscale, Sepia, Sepia Green, Sepia Blue, Color Invert, Gray Invert, Blackboard, Whiteboard, Copper Carving, Blue Carving, Embossment, Contrast, Sketch
	Storage Selection: Phone, Memory card (Only available when external memory card supported)
	Record
	Pause

	Resume Recording
	Stop
Sound Recorder	Storage Selection: Phone, Memory card (Only available when external memory card supported)
	Encode Format: WAV, AMR
	Record
	Pause
	Resume Recording
	Stop
Melody Compose	Edit
	Play
	Save
	Instrument Selection: 10 types Piano, Guitar, Violin, Saxophone, Steel Drums, Flute, Harmonica, Trumpet, Music Box, Xylophone
	Play Speed: Fast, Normal, Slow
	[Notice] Melody composer only support one instrument in one melody file, so the last chosen instrument will be used to play this melody file
FM Radio	Frequencies: 87.5 ~ 108.0
	Skin: 2 skins
	User definable Preset Channel List
	Channel Auto Search
	Background Play
	Record
	Record Format: AMR, WAV
	Record Storage: Phone, Memory Card (Only available when external memory card supported)
JAVA	Preset Channel List generated by auto search
	MIDP 2.0
	CLDC 1.1
	Memory Limit 1MB Support JSR 139,118,120,135,185

Function	Description	Value		Comments
		Code base 05C	Code base 07A	
General	Type of Browser (Browser Name)	Obigo	Obigo	
	Version of the Browser	Q03C	Q03C	
	The usable size of the device's screen in units of pixels (px*px)	128X160	128x160	
	Size of the device's screen in units of characters. (Number of characters per row)x(Number of rows). In calculating this attribute use the largest character in the device's default font.	Variable font width.	Variable font width.	
	Size of the device's screen in units of characters. (Number of characters per row)x(Number of rows). In calculating this attribute use the smallest character in the device's default font.	Variable font width.	Variable font width.	
	Browser version interrogation capability via keypad	No	No	
	Factory configuration option available	No	No	
Bearer	Bearer Selection available to end user via multiple profiles or via bearer options in each profile (circuit or Packet if both available):	Yes	Yes	multiple profile selection with bearer in CSD or GPRS
	Bearer Dependent Display Indication supported (ie End user must be able to differentiate between WAP over a circuit connection from WAP over a Packet connection due to likely charging implications)	Yes	Yes	For CSD, there's a dialing up progress screen. End-user could sense currently using CSD.
	GPRS	Yes	Yes	
	CSD	Yes	Yes	
	Automatic bearer selection	No	No	
Language	Version of WML supported by the browser	1.3	1.3	
	WMLscript support	Yes	Yes	
	Version of XHTML supported by the browser	1.1	1.1	

	Version of HTML supported by the browser	1.1	1.1	
	Maximum WML Deck Size supported (WML Binaire)	30KB	30KB	But it depends on assigned total memory pool. And by content diversity, the value is dynamic .
TAG/ Browing	Is the attribute hspace for images ignored by the device?	No	No	
	Is it possible to select/download images with the device?	Yes	Yes	
	Tables supported? Yes/No	Yes	Yes	
	Is it possible to mask table's border? Yes/No	No	No	
	Is there automatically a breakline after a link? Yes/No	No	No	
	Labels for links supported in the Softkey? Yes/No	No	No	
	Possibility to use SelectList for links? Yes/No	No	No	
	Card title supported? Yes/No	Yes	Yes	
	Is the Back function existing by default for the handset? Yes/No	Yes	Yes	
	Tag <noop/> supported? Yes/No	Yes	Yes	
	Multiple choice and single choice for checkbox supported?	Yes	Yes	
	Input fields supported?	Yes	Yes	
	Styles of characters supported? (<u><i>...)	Yes	Yes	
	Image and text on the same line supported?	Yes	Yes	
	Image and link on the same line supported?	Yes	Yes	
	Link inside a text paragraph supported?	Yes	Yes	
	Horizontal alignment supported? Yes/No	Yes	Yes	
	WAP CSS supported (WAP2.0)? Yes/No	Yes	Yes	

WTA	WTAI supported?	Yes	Yes	
	WTAI make call function supported?	Yes	Yes	
	WTA Save in phonebook	Yes	Yes	
	WTA Send DTMF	No	No	Currently there's no this scenario on handset.
	WTAI location function supported?	No	No	
Security	WTLS supported?	Yes	Yes	
	TLS supported?	Yes	Yes	
	WAP forum certification	Yes	Yes	
	Clear Display Indication that WTLS Security is successful for a given session	Yes	Yes	
	Clear Indication that user has accessed/exited a secure site	No	No	
	1. WTLS Class 2 with >= 128 bit encryption	Yes	Yes	
	2. WTLS Class 3 with >= 128 bit encryption	Yes	Yes	
	Supported Algorithms	SHA-1, MD5	SHA-1, MD5	
	Support of WIM	No	No	
	Certificates store supported?	Yes	Yes	
	1. Verisign	Yes	Yes	
	2. Baltimore	No	No	
	3. Certicom	No	No	
	4. Diversinet	No	No	
	5. Entrust	Yes	Yes	
	6. Globalsign	No	No	
Profile/ Bookmark	Multiple WAP Profile Capability	Yes	Yes	
	WAP Profiles Editable by - End User	Yes	Yes	
	WAP Profiles Editable by - OTAC (via SMS)	Yes	Yes	
	Maximum Number of WAP Settings	10	10	
	Maximum number of bookmarks in the handset	20	20	Customizable
	Maximum number of characters for an URL managed by the handset for GET and POST method	1024	1024	
OTA/ Push	Support OTA Provisionning for the WAP Client? If yes, Which type of OTA?	Yes, OMA OTA & Nokia&Ericsson OTA	Yes, OMA OTA & Nokia&Ericsson OTA	
	1. View settings	Yes	Yes	after set up.
	2. Accept preconfiguration settings	Yes	Yes	

	3. Reject preconfiguration settings	Yes	Yes	
	WAP Push Alerts	Yes	Yes	
	Push bearer SMS	Yes	Yes	
	Push bearer WAP	Yes	Yes	
	Push SI (Service Indication)	Yes	Yes	
	Push SL (Service Loading)	Yes	Yes	
	Push CO (Cache Operation)	Yes	Yes	
	Push SIA (Session Initiation Application)	Yes	Yes	
	Maximum number WAP Push that can be stored/ Memory dimension reserved to WAP Push	15	15	
	is it possible to read Wap push later on ?	Yes	Yes	
	SyncML parameters OTA provisioning (Y/N)?	No	Yes	
	E-mail parameters OTA provisioning	No	Yes	
	IM client parameters OTA provisioning	No	Yes	
	MMS parameters OTA provisioning (OMA, proprietary, none)? * if OMA : SIM card provisioning support (Y/N)? * If YES : could you describe the way to manage the parameters in the SIM and the parameters in the phone?	OMA, SIM card Provisioning support (N)	OMA, SIM card Provisioning support (N)	
	WAP parameters OTA provisioning support (OMA, proprietary, none)? * if OMA : SIM card provisioning support (Y/N)? * If YES : could you describe the way to manage the parameters in the SIM and the parameters in the phone?	OMA, SIM card Provisioning support (N)	OMA, SIM card Provisioning support (N)	
Stack	SAR supported? Yes/No	Yes	Yes	
	Is WTP Concatenation supported by the mobile? Yes/No	Yes	Yes	
	Can the Connect and the Get be sent in the same PDU? Yes/No	No	No	
	Is the mobile able to send multiple GET in the same PDU in case of complex pages (at least 2 images)?	No	No	
	Is the mobile able to send multiple GET in rafale without waiting for to acknowledge the reply in case of complex pages (at least 2 images)?	No	No	
	WP-HTTP	Yes	Yes	
	WP-TCP	Yes	Yes	

	WP-TLS	Yes	Yes	
	Dual Stack 1.x/2.0	Yes	Yes	
Cache/ Cookie	Cache size (bytes)	50KB	50KB	Customiz able
	Default behaviour in case no caching control has been defined for a WML or XHTML page?	Reload Always	Reload Always	
	Default behaviour in case no caching control has been defined for an image?	Reload	Reload	

<<	Previous Section	
	Next Section	>>
	Main Menu	

Section 4

Introduction of Service Level

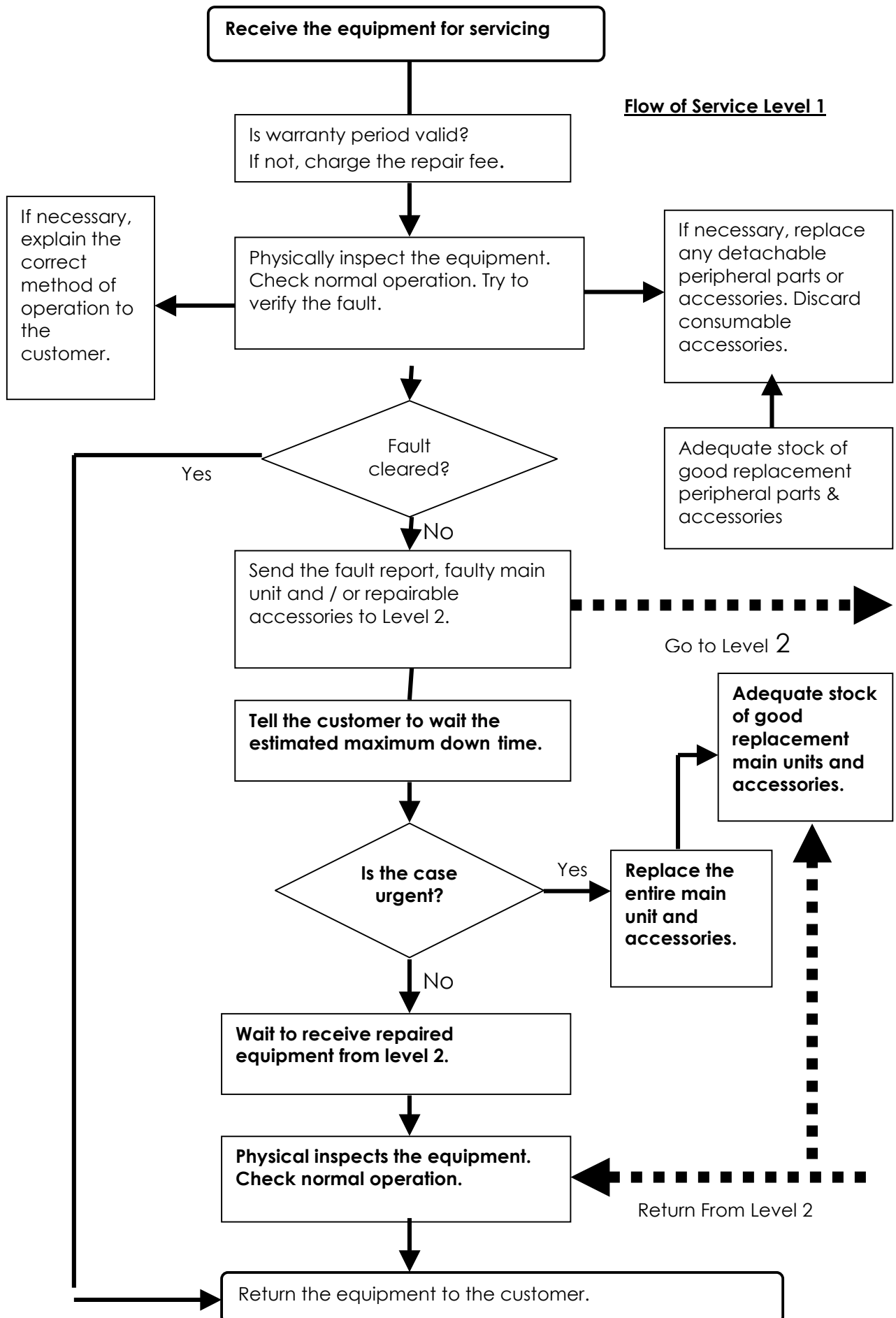
4-1. SERVICE LEVEL 1
4-2. SERVICE LEVEL 2

4-1. SERVICE LEVEL 1

INTRODUCTION OF SERVICE LEVEL 1

The dealers at service level 1 will have to do the following:

1. Attend to the subscriber's complaint. Receive the equipment for servicing from the customer and checking that the warranty period is valid or not.
2. Check the external appearance of the main equipment, peripheral units, and accessories.
3. Check the normal operation and performance of the main equipment, peripheral unit, and accessories.
4. If necessary, replace detachable parts, peripheral units, and accessories that cannot be repaired. Keep a stock of good replacement phone and accessories.
5. If necessary, explain the correct method of operation to the customer.
6. Verify any faulty reported by the end-user at 2. and 3. Above.
7. Specify the symptom and fill out the fault report.
8. Send the fault report and faulty equipment to service level 2. Ask the subscriber to wait for the equipment to be repaired.
9. In certain cases, replace the entire main equipment.
10. Receive back the repaired equipment and carry out a final check.
11. Return the repaired and correctly functioning equipment to the end-user.



TEST EQUIPMENT AND TOOLS FOR SERVICE LEVEL 1

No GSM tester and soldering are required for Service Level 1. The following equipment and tools are recommended for this level.

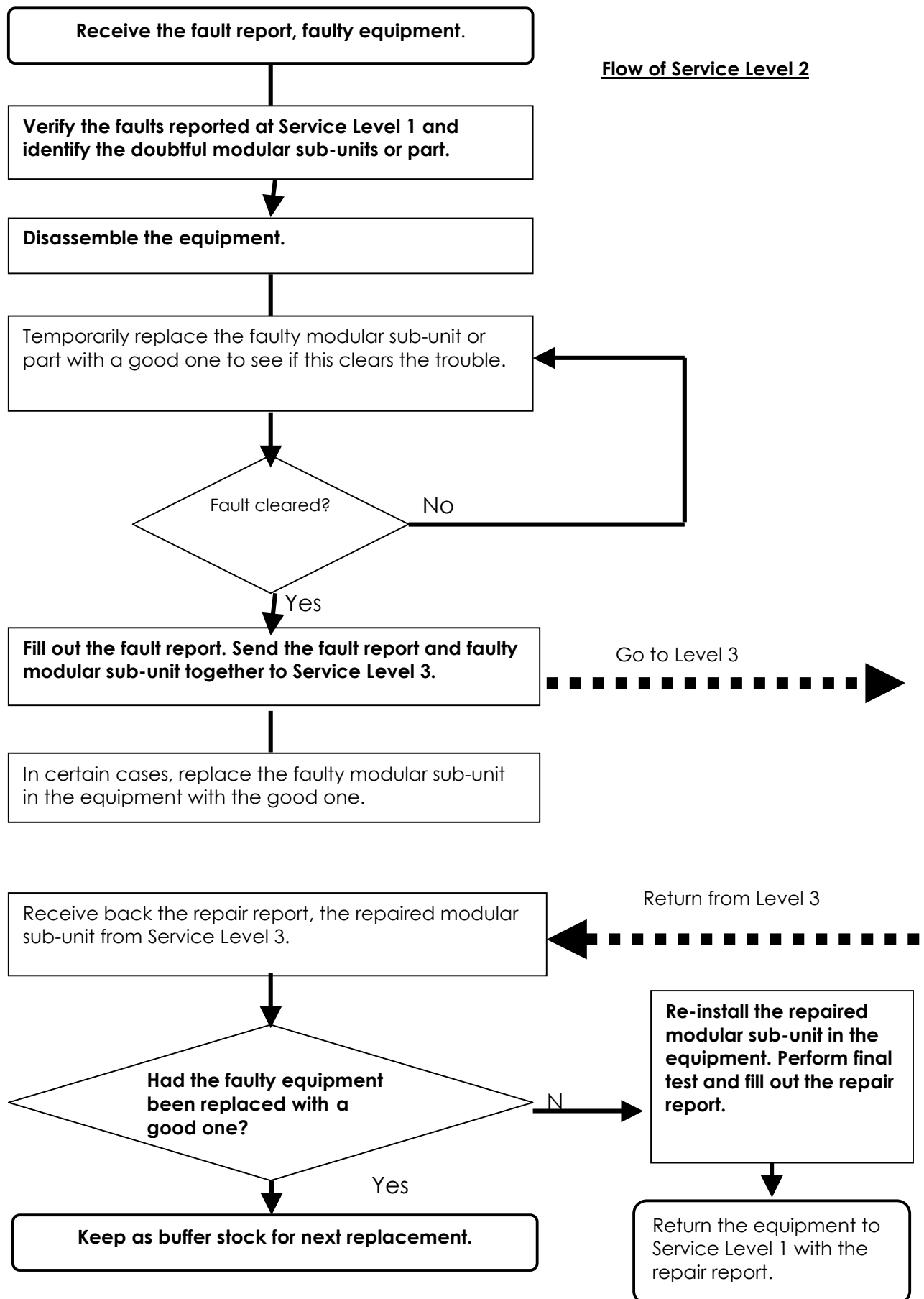
1. Fully charged battery :
Use as a power source or a temporary replacement of original battery for faulty equipment.
2. Workable SIM card :
Used for testing the performance and functions of faulty equipment.
3. Rubber :
Used for cleaning electronic contacts, such as battery terminals, etc.
4. AC Adapter :
Used for testing the charging function of faulty equipment and / or battery.
5. Simple Hands free Kit :
Used for testing the Hands free relevant functions of faulty equipment.
6. USB Cable :
Used for testing the connection between HHP and PC.

4-2. SERVICE LEVEL 2

INTRODUCTION TO SERVICE LEVEL 2

The tasks at Service Level 2 will have to :

1. Receive the fault report and faulty equipment from Service Level 1.
2. Verify the faults reported at Level 1 and check the doubtful modular sub-units or part.
3. Identify the faulty modular sub-unit or part.
4. Disassemble the equipment. Temporarily replace the faulty modular sub-unit or part with a good one to see if this clears the trouble. Specify the faulty modular sub-unit or part in the faulty report.
5. Send the fault report and faulty modular sub-unit together to Service Level 3. In certain cases, replace the faulty modular sub-unit in the equipment with the good one for quick repair.
6. Receive back the repair report, the repaired modular sub-unit from Service Level 3 and re-install it in the equipment. Or keep this repaired modular sub-unit for next replacement, if the faulty modular sub-unit had been replaced with a good one in step 5.
7. Perform the final test with a workable SIM card. Fill out the repair report.
8. Return the equipment to Service Level 1 with the repair report.



<<	Previous Section	
	Next Section	>>
	Main Menu	

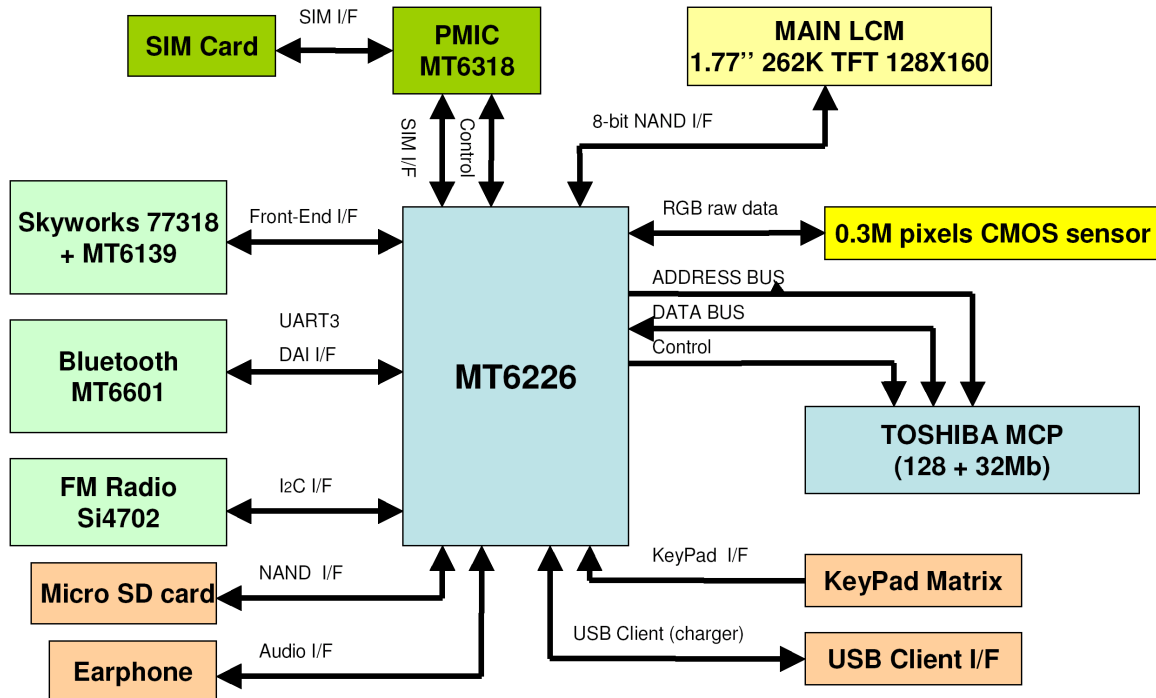
Section 5

Circuit Description & Device information

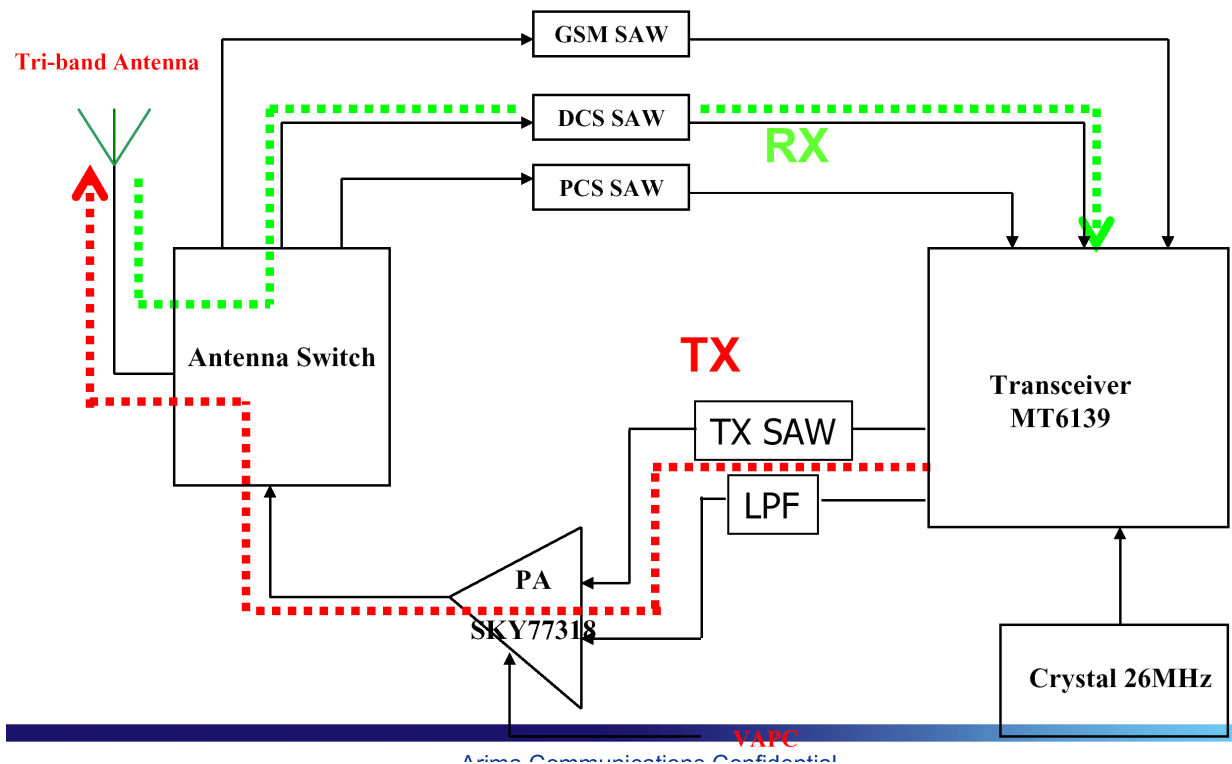
5-1. LOGIC BLOCK DIAGRAM
5-2. LOGIC
5-3. DEVICE INFORMATION
5-4. Circuit Diagrams

5-1. LOGIC BLOCK DIAGRAM

KP199 Block Diagram



RF BLOCK DIAGRAM



5-2. LOGIC

LOGIC AND BASE BAND PORTION

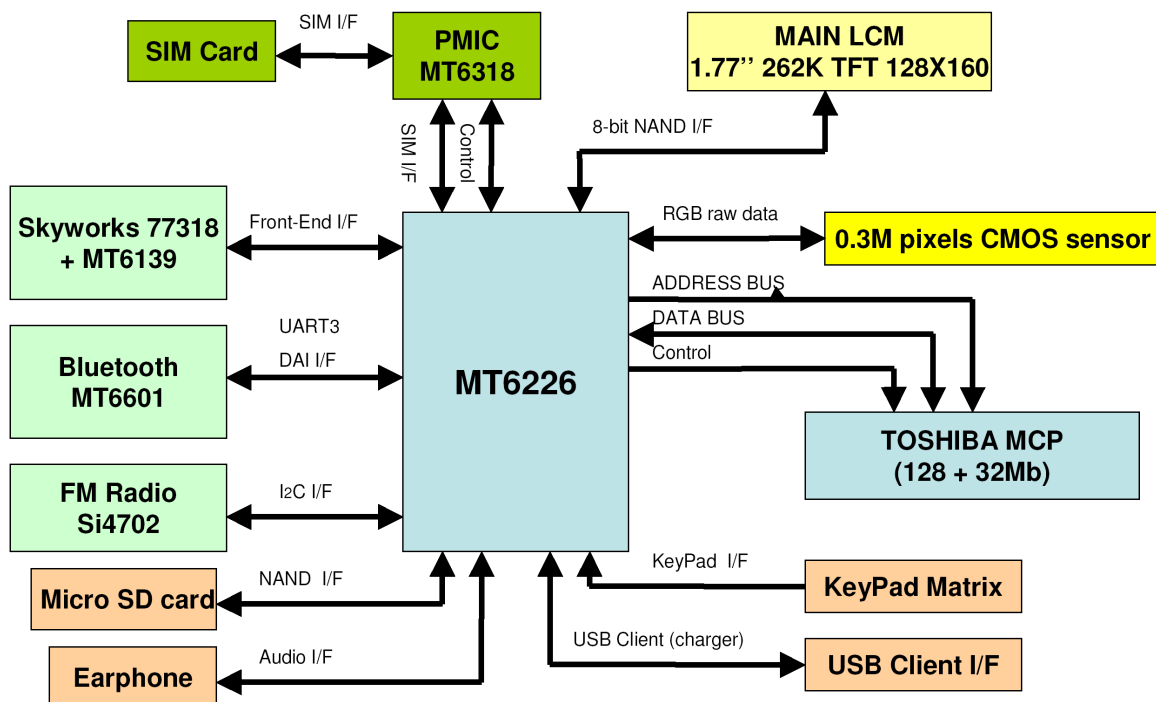
5-2-1. INTRODUCTION

The logic part of 7339 phone is based on Leonardo that is MTK Systems platform. The circuit comprises the following main functional blocks:

- Memory Subsystem
- Baseband CPU(MTK6226)
- MT6318: PMIC handles all baseband power
- FM Radio IC(Si4702)
- Main LCM (262K TFT)
- Camera (0.3M pixels CMOS sensor)
- Bluetooth(MT6601)
- TOSHIBA MCP(128+32MB)
- User I/O (KEY,MINI SD CARD,USB Client, SIM card)

System Block Diagram

KP199 Block Diagram



5-3. DEVICE INFORMATION

5-3-1 CPU (MT6226)

Details the block diagram of MT6226. Based on a dual-processor architecture, MT6226 integrates both an ARM7EJ-S core and a digital signal processor core. ARM7EJ-S is the main processor that is responsible for running high-level GSM/GPRS protocol software as well as multi-media applications. The digital signal processor handles the low-level MODEM as well as advanced audio functions. Except for some mixed-signal circuitries, the other building blocks in MT6226 are connected to either the microcontroller or the digital signal processor.

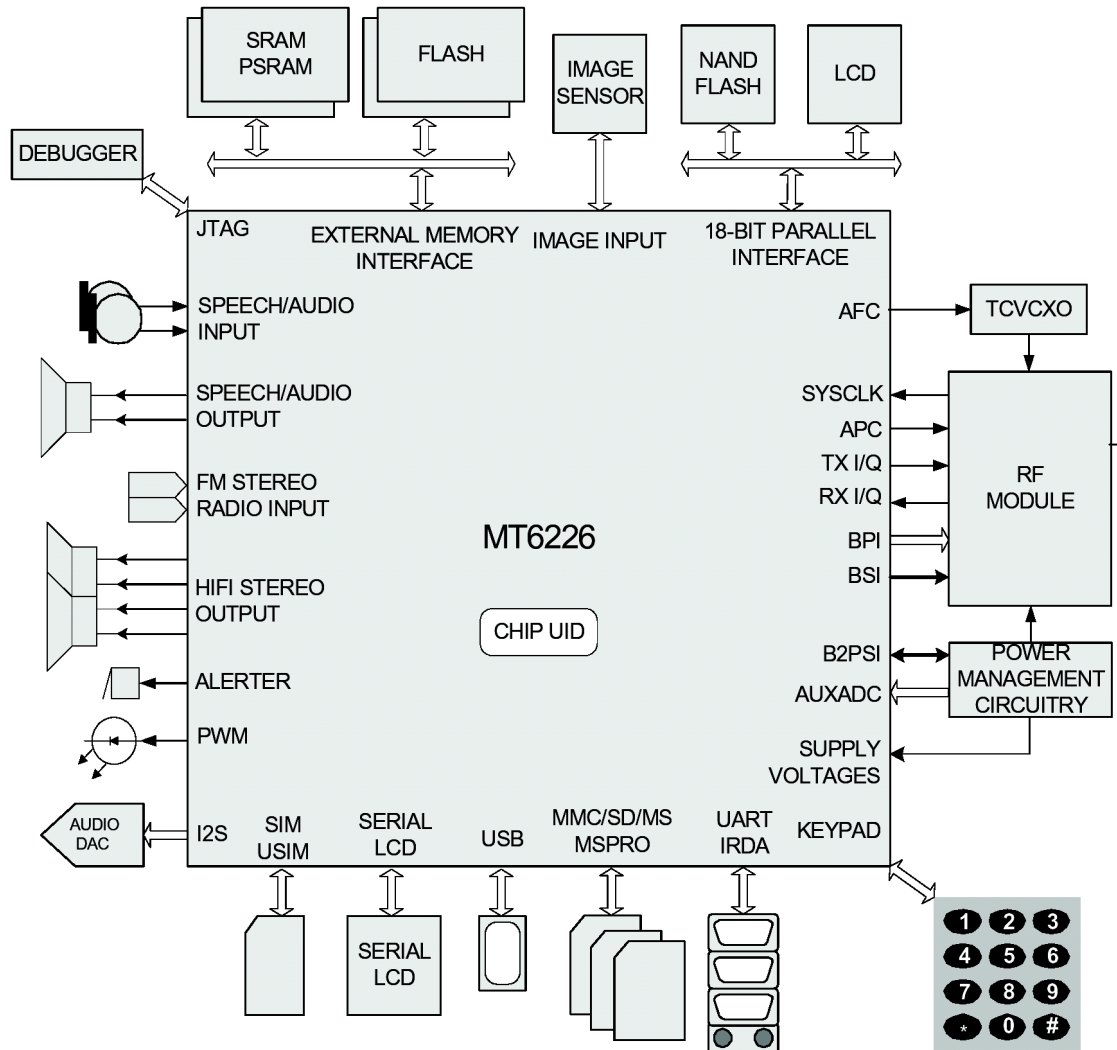
Specifically, MT6226 consists of the following subsystems:

1. Microcontroller Unit (MCU) Subsystem - includes an ARM7EJ-S RISC processor and its accompanying memory management and interrupt handling logics.
 2. Digital Signal Processor (DSP) Subsystem - includes a DSP and its accompanying memory, memory controller, and interrupt controller.
 3. MCU/DSP Interface - where the MCU and the DSP exchange hardware and software information.
 4. Microcontroller Peripherals - includes all user interface modules and RF control interface modules.
 5. Microcontroller Coprocessors - runs computing-intensive processes in place of Microcontroller.
 6. DSP Peripherals - hardware accelerators for GSM/GPRS channel codec.
 7. Multi-media Subsystem - integrates several advanced accelerators to support multi-media applications.
 8. Voice Front End - the data path for converting analog speech from and to digital speech.
 9. Audio Front End - the data path for converting stereo audio from stereo audio source
 10. Baseband Front End - the data path for converting digital signal from and to analog signal of RF modules.
 11. Timing Generator - generates the control signals related to the TDMA frame timing.
- Power, Reset and Clock subsystem - manages the power, reset, and clock distribution inside MT6226. Details of the individual subsystems and blocks are described in following Chapters.

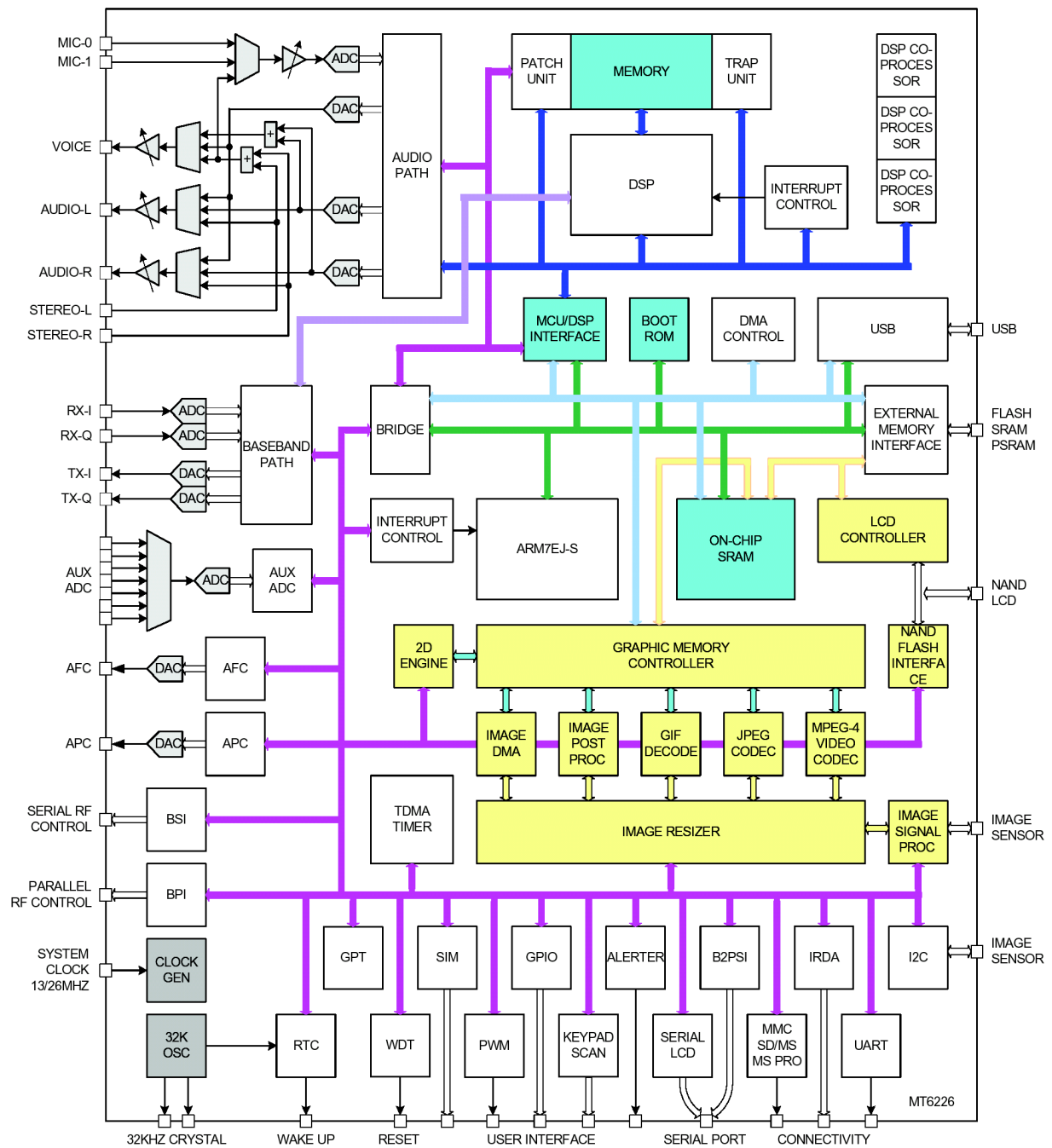
Base band block diagram



MT6226 GSM/GPRS Baseband Processor Data Sheet Revision



Function Block



Pin List

NC(Not Connect) pin indication

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
A	NC	SYSCLK	NC	AFC_BYP	AUXA_DIN6	AUXA_DIN3	AVDD_RFE	BUPAI_N	BDLAI_N	AU_VI_N1_P	AGND_AFE	AU_OTUT0_P	AVSS_BUF	AU_FMINR	AU_MOUTR	VSS33	GPIO9	GPIO8	GPIO5	A
B	XOUT	AVDD_RTC	AVDD_PLL	AFC	AUXA_DIN5	AUXA_DIN2	APC	BUPAI_P	BDLAI_P	AU_VI_N1_N	AU_VREF_P	AU_OTUT0_N	AVDD_BUF	AU_FMINL	AU_MOUTL	VSS33_IS	GPIO7	GPIO6	DAISYNC	B
C	BBWAKEUP	XIN	AVSS_PLL	AUXA_REF	AUXA_DIN4	AUXA_DIN1	AVSS_RFE	BUPA_QN	BDLA_QN	AU_VI_N0_N	AU_VREF_N	AU_MICBIAS_P	NC	NC	AVDD_MBUF	VDDK	GPIO4	DAIRST	DAIPC_MIN	C
D	VDDK	VSS33	TESTMODE	NC	PLL_OUTUT	AUXA_DIN0	AVDD_GSMR_FTX	BUPA_QP	BDLA_QP	AU_VI_N0_P	AVDD_AFE	AU_MICBIAS_N	AU_RBIAS	AVSS_MBUF	NC	KROW1	DAICLK	DAIPC_MOUT	KROW0	D
E	JTMS	JTDI	JTCK	JTRST#	IBOOT	NC	NC	AVSS_GSMR_FTX	AGND_RFE	AVSS_AFE	VDDK	VSS33	NC	VSS33_IS	VDD33_IS	KROW4	KROW3	KROW2	VDD33	E
F	VDD33	BPI_BUS1	BPI_BUS0	JRTCK	JTDO	NLD17									KCOL3	KCOL2	KCOL1	KCOL0	KROW5	F
G	BPI_BUS6	BPI_BUS5	BPI_BUS4	BPI_BUS3	BPI_BUS2	NLD16									IRDA_TXD	IRDA_PDN	KCOL6	KCOL5	KCOL4	G
H	BSL_CS0	VSS33	BPI_BUS9	BPI_BUS8	BPI_BUS7									URXD3	UTXD3	IRDA_RXD	VSS33	VDDK	H	
J	LSDA	LSA0	LSCK	BSL_CLK	BSL_DATA									CMDAT9	CMPLK	CMCLK	CMHREF	CMVREF	NC	UCTS1
K	VDD33	LPCE1#	LSCE1#	LSCE0#	NC	CMDAT7	NLD11	NLD9	NLD10	CMRST	CMPDN	SIMVC	SIMSEL	SIMDATA	URXD1	UTXD1	K			
L	LWR#	LPA0	LRD#	LRST#	LPCE0#	CMDAT6	NLD13	NLD14	NLD15	CMDAT0	GPIO2	GPIO3	SIMCLK	SIMRST	VDD33	L				
M	VDDK	VSS33	NLD5	NLD6	NLD7	CMDAT5	CMDAT4	CMDAT3	CMDAT2	CMDAT1	VDD33_MC	MCWP	MCINS	MCCK	GPIO1	M				
N	NLD0	NLD1	NLD2	NLD3	NLD4	MT6226 TFBGA Top-View								MCDA0	MCDA1	MCDA2	MCDA3	MCPWRON	N	
P	NRE#	NWE#	NALE	NCLE	NRNB									VDD33_USB	USB_DP	USB_DM	VSS33_MC	MCCM0	P	
R	VDD33	PWM2	PWM1	NCE#	MIRQ	EA14	EA10	EA7	NC	EA0	EWAIT	ECS4#	ECS0#	ELB#	ED1	ED0	MFIQ	WATCDHOG	VSS33_EMI	R
T	SRCLKENA	SRCLKENAI	SRCLKENAN	ALERTER	EA18	EA15	EA11	EA8	EA4	EA1	EPDN#	ECS5#	ECS1#	EUB#	ED13	ED11	ED3	VDD33_EMI	ED2	T
U	SYSRST#	GPIO0	EINT1	EA23	EA19	EA16	EA12	VSS33_EMI	EA5	EA2	EADV#	ECS6#	ECS2#	ERD#	ED14	VSS33_EMI	ED8	ED5	ED4	U
V	EINT0	EINT3	VSS33_EMI	EA22	EA20	VSS33_EMI	EA13	VDDK	EA6	VSS33_EMI	ECLK	VSS33_EMI	ECS3#	VSS33_EMI	ED15	VDDK	ED9	ED6	VSS33_EMI	V
W	EINT2	EA25	EA24	VDD33_EMI	EA21	EA17	VDD33_EMI	EA9	VDD33_EMI	EA3	VDD33_EMI	ECS7#	VDD33_EMI	EWR#	VDD33_EMI	ED12	ED10	VDD33_EMI	ED7	W
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	

5-3-2.PMU IC MT 6318

1. Handles all GSM/GPRS Baseband Power Management
2. Input range: 2.8 V ~ 5.0 V
3. Charger input of up to 15 V
4. 11 LDOs optimized for specific GSM/GPRS subsystems
5. 2-step RTC LDO
6. 600 mW Class AB audio amplifier
7. Booster for series backlight LED driver
8. Charge pump for parallel backlight LED driver
9. SPI interface
10. Pre-charge indication
11. Li-ion battery charge function
12. SIM card interface
13. RGB LED driver
14. Vcore for power-saver mode
15. Over-current and thermal overload protection
16. Programmable under voltage lockout protection
17. Power-on reset and start-up timer
18. 96-pin TFBGA package

1.2 Applications

GSM/GPRS mobile handsets, basic phones and high-end phones.

1.3 General Description

The MT6318 is a power management system chip optimized for GSM/GPRS handsets, especially those based on the MediaTek MT621x/MT622x system solution. MT6318 contains 11 LDOs, one to power each of the critical GSM/GPRS sub-blocks. Sophisticated controls are available for power-up during battery charging, for the keypad interface, and for the RTC alarm. The MT6318 is optimized for maximum battery life.

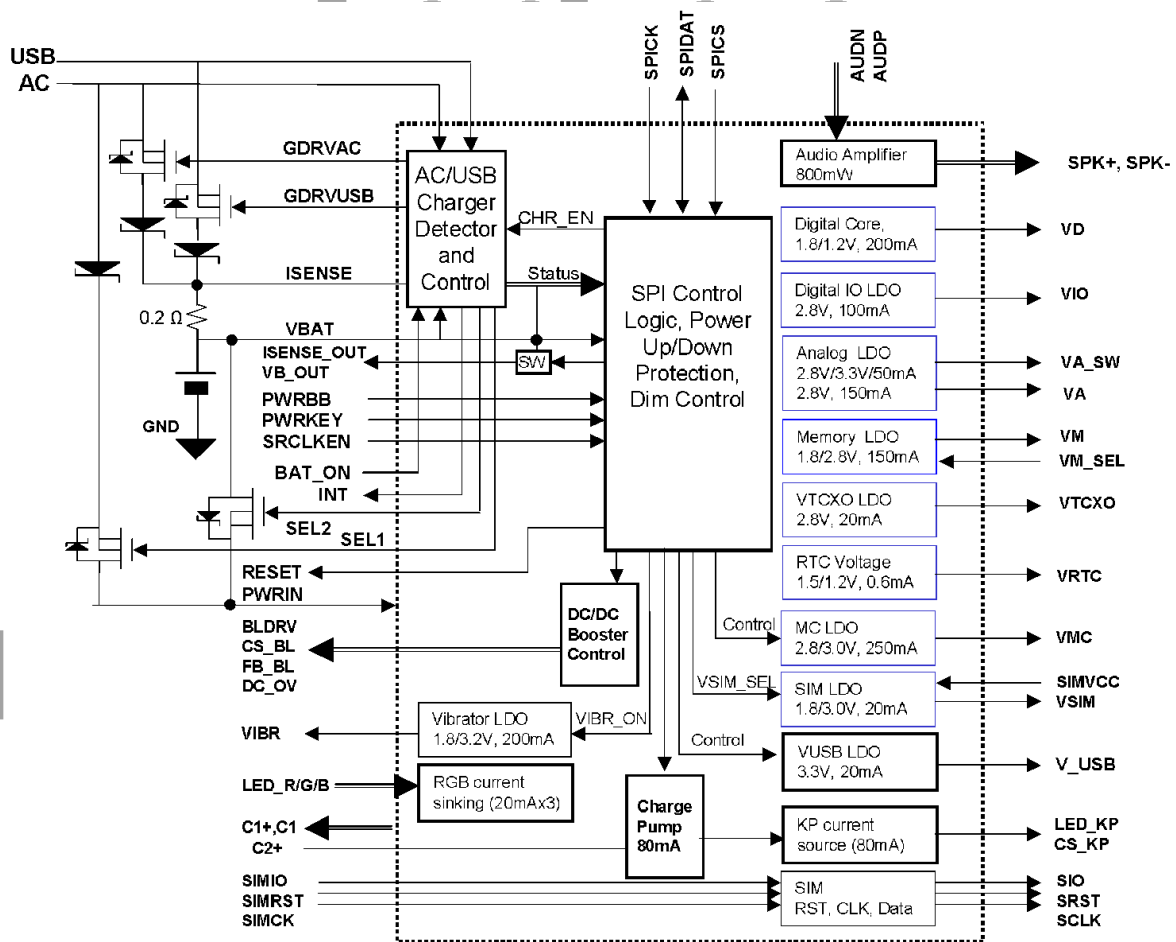
The 2-step RTC LDO design allows the RTC circuit to stay alive without a battery for several hours.

The MT6318 battery charger can be used with a lithium-ion (Li+) battery.

The SIM interface provides the level shift between SIM card and microprocessor.

The MT6318 is available in a 96-pin TFBGA package. The operating temperature range is -25°C to +85°C.

Functional block:



PIN sheet
NC(Not Connect) pin indication

Figure 1: MT6318 TFBGA 96(7x7 mm²) Pin Assignments

	1	2	3	4	5	6	7	8	9	10	
A	LED_KP	C2+	C1+	C1+	PWRIN4	FB_BL	BLDRV	PWRIN3	PWRBB	BAT_BACKUP	A
B	VO_G	VO_R	CS_KP	DC_OV	PWRIN4	CS_BL	RST CAP	PWRIN3	INT	BAT_ON	B
C	V_USB	VO_B	GND4	GND4	PWRIN4	GND4	GND4	PWRIN3	RTC_SEL	VIO	C
D	USB	GDR VUSB	GND1	GND4	PWRIN4	GND4	GND3	GND3	PWRIN2	PWRIN2	D
E	AC	GDR VAC	GND1	GND1			GND3	GND3	VD_SEL	VA_SW	E
F	VBAT	ISENSE	GND1	GND1			GND3	SPICS	RESET	VIBR	F
G	VN	SEL2	GND1	GND1	GND2	GND2	GND2	SPICK	SRCLK EN	VRTC	G
H	VTCXO	SEL1	SEL1 _EN	GND2	ISENSE _OUT	GND2	GND2	SIO	SIM VCC	SIM RST	H
J	PWRIN1	PWRIN1	PWRIN1	VB_OUT	AUDP	AUDN	SIMIO	SPIDAT	SRST	VD	J
K	VA	BP/REF	VMC	VM_SEL	SPK+	SPK-	PWR KEY	VSIM	SIM CLK	SCLK	K
	1	2	3	4	5	6	7	8	9	10	

Table 1: MT6188 Pin Descriptions

Pin	Symbol	Input (I), Output (O), or Analog (A)	Description
Control			
K7	PWRKEY	I	Power on button input. Active low.
A9	PWRBB	I	Power on/off from microprocessor. Active high.
G9	SRCLKEN	I	VTCXO and VA enable. High = enable. Low = disable.
H9	SIMVCC	I	VSIM enable. High = enable. Low = disable.
B10	BAT_ON	I	Indication that Li-ion battery is inserted. High = no battery. Low = battery inserted.
B4	DC_OV	I	DC/DC protection input. OV threshold voltage is 1V.
K4	VM_SEL	I	External memory supply selection. 1 = 2.8V, 0 = 1.8V.
H3	SEL1_EN	I	Enable the "pre-charge indication" function. 1 = enable, 0 = disable. (Note1)
C9	RTC_SEL	I	VRTC output voltage selection. 1 = 1.5V, 0 = 1.2V (Note1)
E9	VD_SEL	I	VD output voltage selection. 1 = 1.8V/1.5V, 0 = 1.2V/0.9V (depending on the register PWR_SAVE setting).
Charger Control			
E1	AC	IA	AC-DC adaptor input
D1	USB	IA	USB power input
C1	V_USB	OA	3.3V USB power output
B9	INT	O	Interrupt PIN. Active low. This pin informs the BB if an AC or USB voltage is detected, or if OVP (AC > 9V) is detected. Is reset to normal high after BB has communicated with the PMIC through SPI.
D2	GDRVUSB	OA	Control output to the gate of the external p-channel FET for the USB charger.
E2	GDRVAC	OA	Control output to the gate of the external p-channel FET for the AC charger.
F2	ISENSE	OA	Charger current sensing input
H2	SEL1	OA	Control output to the gate of the external PMOS for the AC charger input as power source.
G2	SEL2	OA	Control output to the gate of the external PMOS for the VBAT input as power source.
SIM Interface			
J7	SIMIO	I/O	Non level-shifted SIM data (3V)
H10	SIMRST	I	Non level-shifted SIM reset input (3V)
K9	SIMCLK	I	Non level-shifted SIM clock input (3V)
H8	SIO	I/O	Level-shifted SIM data (1.8/3V)
J9	SRST	O	Level-shifted SIM reset output (1.8/3V)
K10	SCLK	O	Level-shifted SIM clock output (1.8/3V)
Reset			
B7	RSTCAP	IA	Reset delay time capacitance
F9	RESET	O	System reset. Low active.

Power-Related			
F1	VBAT	IA	Battery input voltage
J1, J2, J3, D9, D10, A8, B8, C8, A5, B5, C5, D5	PWRIN	IA	Power input
J4	VB_OUT	OA	Battery output voltage. Switchable.
H5	ISENSE_OUT	OA	ISENSE output voltage. Switchable.
K2	BP/VREF	OA	Bandgap reference and bypass capacitance
D3, E3, E4, F3, F4, G3, G4, G5, G6, G7, H4, H6, H7, D7, D8, E7, E8, F7, C3, C4, C6, C7, D4, D6	GND		Ground
J10	VD	OA	Digital core supply
C10	VIO	OA	Digital IO supply
K1	VA	OA	Analog supply
E10	VA_SW	OA	Auxiliary analog supply. Switchable.
H1	VTXO	OA	TCXO supply
G1	VM	OA	Memory supply
K8	VSIM	OA	SIM supply
G10	VRTC	OA	RTC supply
K3	VMC	OA	Memory card supply
Miscellaneous			
F10	VIBR	OA	Vibrator driver
A3	C1+	A	Charge pump capacitor. Positive terminal
A4	C1-	A	Charge pump capacitor. Negative terminal
A2	C2+	A	Charge pump output
A10	BAT_BACKUP	OA	Backup battery pin for 2-step RTC
Speaker Amplifier			
J5	AUDP	IA	Audio positive input
J6	AUDN	IA	Audio negative input
K5	SPK+	OA	Speaker positive output
K6	SPK-	OA	Speaker negative output
LED Driver			
B2	VO_R	IA	R LED current driver
B1	VO_G	IA	G LED current driver
C2	VO_B	IA	B LED current driver
A1	LED_KP	OA	KP LED driver
B3	CS_KP	IA	KP LED current sensor
A7	BLDRV	OA	Control output to the gate of the external FET for the backlight DC-DC converter.
B6	CS_BL	IA	Voltage sensor input for external BL FET current
A6	FB_BL	IA	Voltage sensor input from white LED ballast resistor
SPI Interface			
F8	SPICS	I	Serial port select input
G8	SPICK	I	Serial port clock input
J8	SPIDAT	IO	Serial port I/O

5-3-3 FLASH MEMORY

KP199 handset memory;

Memory: (128Mb NOR+64Mb pSRAM+512Mb NAND)

. Memory

KP199 is used 128Mb NORMb+64Mb pSRAM+512Mb NAND flash of Mixed Multi-Chip Package

DESCRIPTION

The TV00679002/003DAGD is a mixed multi-chip package containing a 67,108,864-bit pseudo static RAM and a 134,217,728-bit Nor Flash Memory and a 553,648,128-bit NAND E²PROM. The TV00679002/003DAGD is available in a 107-pin BGA package making it suitable for a variety of applications.

MCP Features

1. Power supply voltage of 2.7 to 3.3 V
2. Operating temperature of -30°C to 85°C
3. Package P-FBGA107-0912-0.80DZ (Weight: 0.26 g)

Pseudo SRAM Features

1. Organization : 4M 16 bits
2. Power dissipation
 - Operating: 50 mA maximum
 - Standby: 150 A maximum
 - Deep power-down standby: 5 A maximum
3. Access time : Random / Page : 70 ns / 30 ns @CL=30pF
4. Page read operation by 8 words
5. Deep power-down mode : Memory cell data invalid

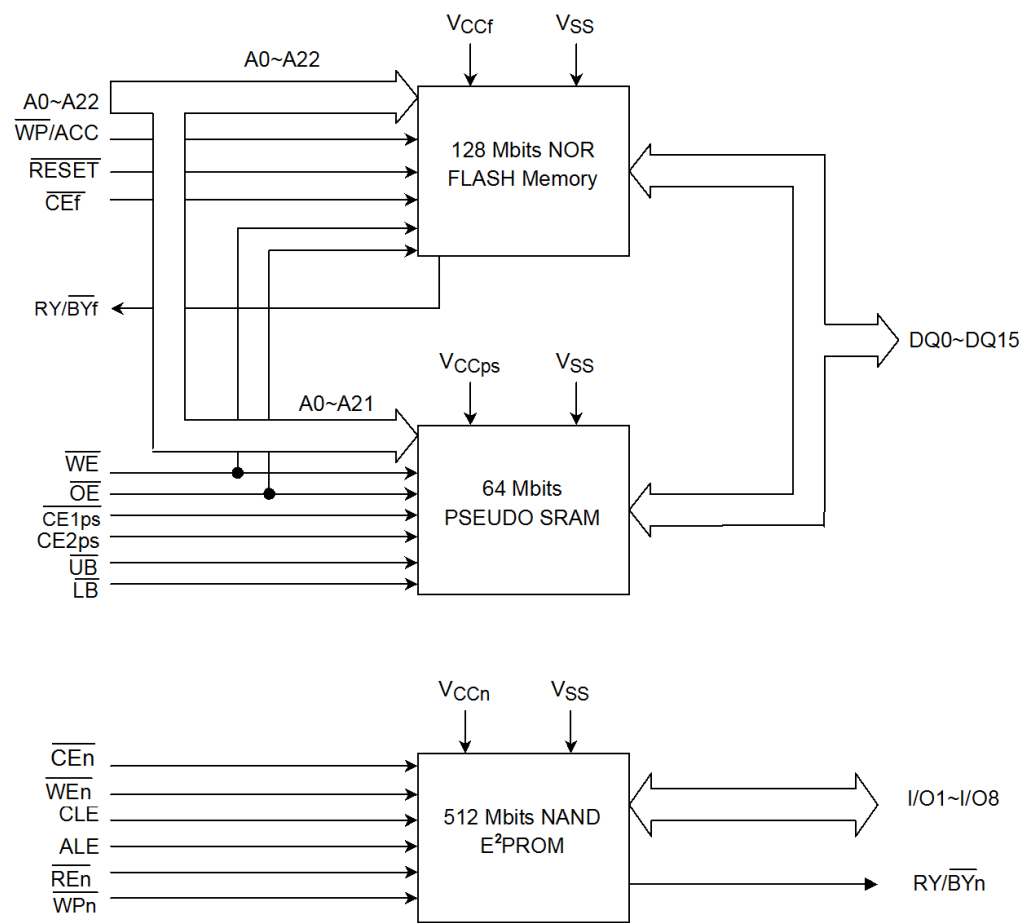
Nand E 2 PROM Features

1. Organization
 - Memory cell array: 2112X32KX8
 - Register: 2112X8 bits
 - Page size: 2112 bytes
 - Block size: (128KX4K) bytes
2. Power dissipation
 - Read operating: 30 mA maximum
 - Program operating: 30 mA maximum
 - Erase operating: 30 mA maximum
 - Standby: 50 A maximum
3. Access time
 - Cell array register: 30 s
 - Serial read cycle: 50 ns @CL=100pF
4. Modes
 - Read, Reset, Auto page program Auto block erase, Status read
5. Mode control: Serial input / output, Command control

Nor Flash Memory Features

1. Organization: 8MX16 bits
 2. Power dissipation
 - Read operating : 55 mA maximum
 - Address Increment Read operation: 11 mA maximum
 - Page Read operating : 5 mA maximum
 - Program / Erase operating: 15 mA maximum
 - Standby : 10 A maximum
 3. Access time
 - Random : 65 ns @CL=30pF 70 ns @CL=100pF
 - Page : 25 ns @CL=30pF 30 ns @CL=100pF
 4. Functions
 - Simultaneous Read/Write
 - Page Read
 - Auto Program, Auto Page Program
 - Auto Block Erase, Auto Chip Erase
 - Fast Program Mode/Acceleration Mode
 - Program Suspend/Resume
 - Erase Suspend/Resume
 - Data polling/Toggle bit
 - Password block protection
 - Block protection/ Boot block protection
 - Automatic Sleep, support for hidden ROM area
 - Common Flash memory Interface (CFI)
 5. Block erase architecture 8X4 Kwords / 255X32 Kwords
 6. Bank architecture
 - 16M BitsX8 Bank
 7. Boot block architecture
 - TV00679002DAGD: top boot block
 - TV00679003DAGD: bottom boot block
 8. Mode control: Compatible with JEDEC standard commands
- Erase/Program cycles 100,000 cycles type.

BLOCK DIAGRAM



[Pin sheet](#)

NC(Not Connect) pin indication

PIN ASSIGNMENT (TOP VIEW)

	1	2	3	4	5	6	7	8	9	10
A	NC	NC							NC	NC
B		NC	NC	NC	NC	NC	NC	NC	NC	NC
C	RY/ $\overline{\text{BY}}_n$	NC	A7	$\overline{\text{LB}}$	$\overline{\text{WP/ACC}}$	$\overline{\text{WE}}$	A8	A11	NC	NC
D	$\overline{\text{RE}}_n$	A3	A6	$\overline{\text{UB}}$	$\overline{\text{RESET}}$	CE2ps	A19	A12	A15	NC
E	$\overline{\text{CE}}_n$	A2	A5	A18	RY/ $\overline{\text{BY}}_f$	A20	A9	A13	A21	NC
F	VCCn	A1	A4	A17	NC	NC	A10	A14	A22	VCCn
G	VSS	A0	VSS	DQ1	NC	NC	DQ6	NC	A16	VSS
H	CLE	$\overline{\text{CE}}_f$	$\overline{\text{OE}}$	DQ9	DQ3	DQ4	DQ13	DQ15	NC	I/O8
J	ALE	CE1ps	DQ0	DQ10	VCCf	VCCps	DQ12	DQ7	VSS	I/O7
K	$\overline{\text{WE}}_n$	$\overline{\text{WP}}_n$	DQ8	DQ2	DQ11	NC	DQ5	DQ14	I/O5	I/O6
L	NC	NC	NC	NC	NC	I/O1	I/O2	I/O3	I/O4	NC
M	NC	NC							NC	NC

Pin List

PIN NAMES

A0 to A22	Address inputs for Pseudo SRAM & Nor Flash Memory
DQ0 to DQ15	Data inputs / outputs for Pseudo SRAM & Nor Flash Memory
I/O1 to I/O8	Data inputs / outputs for Nand E ² PROM
$\overline{\text{CE1ps}}$, CE2ps	Chip enable inputs for Pseudo SRAM
$\overline{\text{CEf}}$	Chip enable input for Nor Flash Memory
$\overline{\text{CEn}}$	Chip enable input for Nand E ² PROM
$\overline{\text{OE}}$	Output enable input for Pseudo SRAM & Nor Flash Memory
$\overline{\text{WE}}$	Write enable input for Pseudo SRAM & Nor Flash Memory
$\overline{\text{REn}}$	Read enable input for Nand E ² PROM
WEEn	Write enable input for Nand E ² PROM
$\overline{\text{LB}}$, $\overline{\text{UB}}$	Data byte control inputs for Pseudo SRAM
CLE	Command latch enable input for Nand E ² PROM
ALE	Address latch enable input for Nand E ² PROM
$\overline{\text{WP/ACC}}$	Write protect /program acceleration input for Nor Flash Memory
$\overline{\text{WPn}}$	Write protect input for Nand E ² PROM
$\overline{\text{RESET}}$	Hardware reset input for Nor Flash Memory
$\text{RY/}\overline{\text{BYf}}$	Ready/Busy output for Nor Flash Memory
$\text{RY/}\overline{\text{BYn}}$	Ready/Busy output for Nand E ² PROM
V_{CCps}	Power supply for Pseudo SRAM
V_{CCf}	Power supply for Nor Flash Memory
V_{CCn}	Power supply for Nand E ² PROM
V_{SS}	Ground
NC	Not connected

PIN NAME CONVERSION TABLE

MCP Pin		64M	128M	512M
Location	Name	PSRAM	Nor	Nand
A1	NC	–	–	–
A2	NC	–	–	–
A3	–	–	–	–
A4	–	–	–	–
A5	–	–	–	–
A6	–	–	–	–
A7	–	–	–	–
A8	–	–	–	–
A9	NC	–	–	–
A10	NC	–	–	–
B1	–	–	–	–
B2	NC	–	–	–
B3	NC	–	–	–
B4	NC	–	–	–
B5	NC	–	–	–
B6	NC	–	–	–
B7	NC	–	–	–
B8	NC	–	–	–
B9	NC	–	–	–
B10	NC	–	–	–
C1	RY/BY _n	–	–	RY/BY
C2	NC	–	–	–
C3	A7	A7	A7	–
C4	LB	LB	–	–
C5	WP/ACC	–	WP/ACC	–
C6	WE	WE	WE	–
C7	A8	A8	A8	–
C8	A11	A11	A11	–
C9	NC	–	–	–
C10	NC	–	–	–
D1	REN	–	–	RE
D2	A3	A3	A3	–
D3	A6	A6	A6	–
D4	UB	UB	–	–
D5	RESET	–	RESET	–
D6	CE2ps	CE2ps	–	–
D7	A19	A19	A19	–
D8	A12	A12	A12	–
D9	A15	A15	A15	–
D10	NC	–	–	–
E1	CEN	–	–	CE
E2	A2	A2	A2	–
E3	A5	A5	A5	–
E4	A18	A18	A18	–
E5	RY/BY _f	–	RY/BY	–
E6	A20	A20	A20	–
E7	A9	A9	A9	–
E8	A13	A13	A13	–
E9	A21	A21	A21	–
E10	NC	–	–	–
F1	VCC _n	–	–	VCC
F2	A1	A1	A1	–
F3	A4	A4	A4	–
F4	A17	A17	A17	–
F5	NC	–	–	–
F6	NC	–	–	–
F7	A10	A10	A10	–
F8	A14	A14	A14	–
F9	A22	–	A22	–
F10	VCC _n	–	–	VCCQ

MCP Pin		64M	128M	512M
Location	Name	PSRAM	Nor	Nand
G1	VSS	GND	VSS	VSS
G2	A0	A0	A0	–
G3	VSS	GND	VSS	VSS
G4	DQ1	I/O2	DQ1	–
G5	NC	–	–	–
G6	NC	–	–	–
G7	DQ6	I/O7	DQ6	–
G8	NC	–	–	–
G9	A16	A16	A16	–
G10	VSS	GND	VSS	VSS
H1	CLE	–	–	CLE
H2	CE _f	–	CE	–
H3	OE	OE	OE	–
H4	DQ9	I/O10	DQ9	–
H5	DQ3	I/O4	DQ3	–
H6	DQ4	I/O5	DQ4	–
H7	DQ13	I/O14	DQ13	–
H8	DQ15	I/O16	DQ15	–
H9	NC	–	–	–
H10	I/O8	–	–	I/O8
J1	ALE	–	–	ALE
J2	CE1ps	–	–	–
J3	DQ0	I/O1	DQ0	–
J4	DQ10	I/O11	DQ10	–
J5	VCC _f	–	VDD	–
J6	VCC _{ps}	VDD	–	–
J7	DQ12	I/O13	DQ12	–
J8	DQ7	I/O8	DQ7	–
J9	VSS	GND	VSS	VSS
J10	I/O7	–	–	I/O7
K1	WEn	–	–	WE
K2	WPh	–	–	WP
K3	DQ8	I/O9	DQ8	–
K4	DQ2	I/O3	DQ2	–
K5	DQ11	I/O12	DQ11	–
K6	NC	–	–	–
K7	DQ5	I/O6	DQ5	–
K8	DQ14	I/O15	DQ14	–
K9	I/O5	–	–	I/O5
K10	I/O6	–	–	I/O6
L1	NC	–	–	–
L2	NC	–	–	–
L3	NC	–	–	–
L4	NC	–	–	–
L5	NC	–	–	–
L6	I/O1	–	–	I/O1
L7	I/O2	–	–	I/O2
L8	I/O3	–	–	I/O3
L9	I/O4	–	–	I/O4
L10	NC	–	–	–
M1	NC	–	–	–
M2	NC	–	–	–
M3	–	–	–	–
M4	–	–	–	–
M5	–	–	–	–
M6	–	–	–	–
M7	–	–	–	–
M8	–	–	–	–
M9	NC	–	–	–
M10	NC	–	–	–

5-3-4 CAMERA MODULE

5-3-4 Camera Module

Description

The F0308SS project is a **socket type** compact camera module with 1/8" VGA CMOS image sensor. The ISP is skipped in this module and only can output the **8-bit raw data** (RGB Bayer Pattern). The I/O output voltage is defined as 2.8V. The programmable functions are controlled by host processor via 2-wire I2C bus interface. The S5K83AFX03-F1XA, which needs a single master clock with the range of 12MHz to 24MHz, is suitable for low power camera module with 2.8V/1.8V power supply.

For the mechanical design, the F0308SS is suitable for SMK CCM socket and all compatible sockets. Customer need to confirm their image orientation to design in the F0308SS CCM.

5-2-12.2 Specifications

Features

- Optical size: 1/8 inch
- Unit pixel size: 2.8 um x 2.8 um
- Effective resolution: 640 (H) x 480 (V), VGA
- Color filter: RGB Bayer Pattern
- Shutter type: Electronic Rolling Shutter
- Scan mode: Line Progressive Readout
- Output format: **8-bit Raw Data**
- Max. frame rate:
15fps @ VGA, 12MHz(30fps @ VGA, 24MHz)
- ADC resolution: 10/9/8-Bit
- Lens shading correction
- Color interpolation and Color correction
- Edge enhancement
- Gamma correction
- Image Effect: Sepia, Aqua, Nega, Gray, Reg, Green, Blue
- Image scaling: CIF, QVGA, QCIF, QQVGA, and SubQCIF
- Auto Bad Pixel Replacement (Defect correction)
- Auto Dark Level Compensation
- Auto Flicker Correction
- Auto Exposure (AE)
- Auto White Balance (AWB)
- Programmable Functions:
 - WOI (Window of Interest) Panning, Cropping, Sizing and Sub-sampling
 - Vertical Flip and Horizontal Mirror
 - Exposure, Gain and Frame Rate Control
- Host interface: IIC bus interface
- Internal PLL
- Internal Regulator for 1.8V Core Supply Voltage
- 8-Bit Parallel and High Speed SubLVDS Data/Clock Interface
- Built-In Test Image Generation
- Stand-By Mode for Power Saving
- Operating Temperature: -20°C to +60°C
- Supply voltage: 2.8V for Analog and I/O, 1.8V for Core Digital
- Maximum pixel(data output) clock: 24MHz
- External master clock: up to 24MHz

Pin List

*Camera Top-view Foot print mage Top

P/N	Signal Name	Type	Description
1	VSYNC	Output	Vertical sync output
2	HREF(HSYNC)	Output	HREF output
3	D7	Output	YUV/RGB video component output bit[7]
4	D6	Output	YUV/RGB video component output bit[6]
5	DGND	Power	Digital ground
6	DVDD(DVDD18)	Power	Power supply(+1.8VDC) for digital logic core
7	AGND	Power	Analog ground
8	DOVDD	Power	Digital Power supply for I/O (+2.8V)
9	MCLK	Input	System clock input
10	AVDD	Power	Analog power supply(+2.8V)
11	RESET(RSTN)	Input	Clears all registers and resets them to their default values 0:Reset mode 1:Normal mode
12	SDA	I/O	SCCB serial interface data I/O
13	SCL	Input	SCCB serial interface clock input
14	PCLK	Output	Pixel clock output
15	D0	Output	YUV/RGB video component output bit[0]
16	D1	Output	YUV/RGB video component output bit[1]
17	D2	Output	YUV/RGB video component output bit[2]
18	D3	Output	YUV/RGB video component output bit[3]
19	D4	Output	YUV/RGB video component output bit[4]
20	D5	Output	YUV/RGB video component output bit[5]

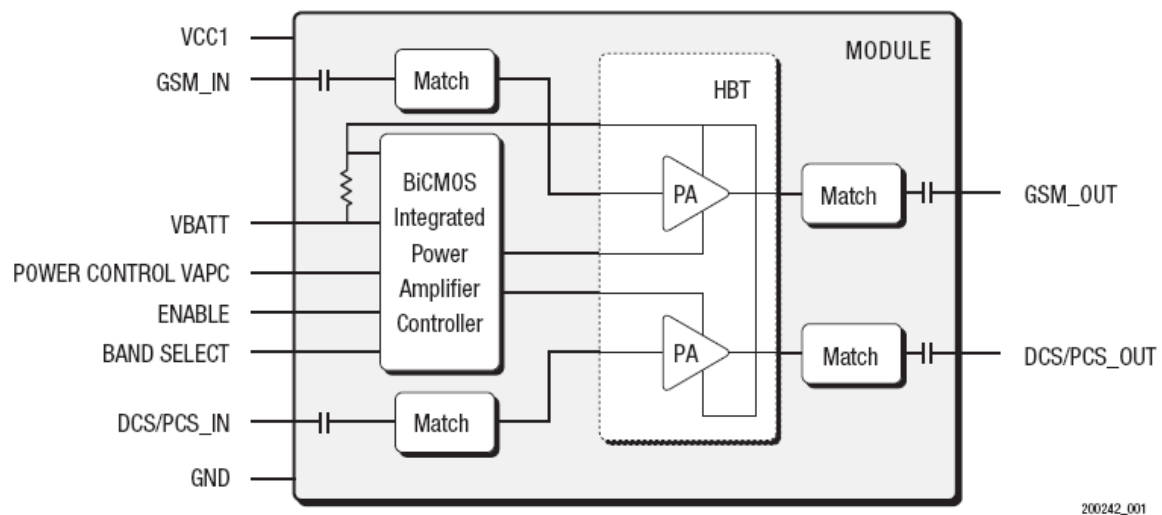
5-3-5 FRONT END MODULE (TX/RX SWITCH)

Pin List

Pin No.	Symbol	Description
1	CE1	Chip Enable Pin 1 ("H" Active)
2	GND	Ground Pin
3	CE2	Chip Enable Pin 2 ("H" Active)
4	NC	No Connection
5	NC	No Connection
6	V _{OUT2}	Output Pin 2
7	V _{DD}	Input Pin
8	V _{OUT1}	Output Pin 1

5-3-6 POWER AMP MODULE (PA)

1. Function Block

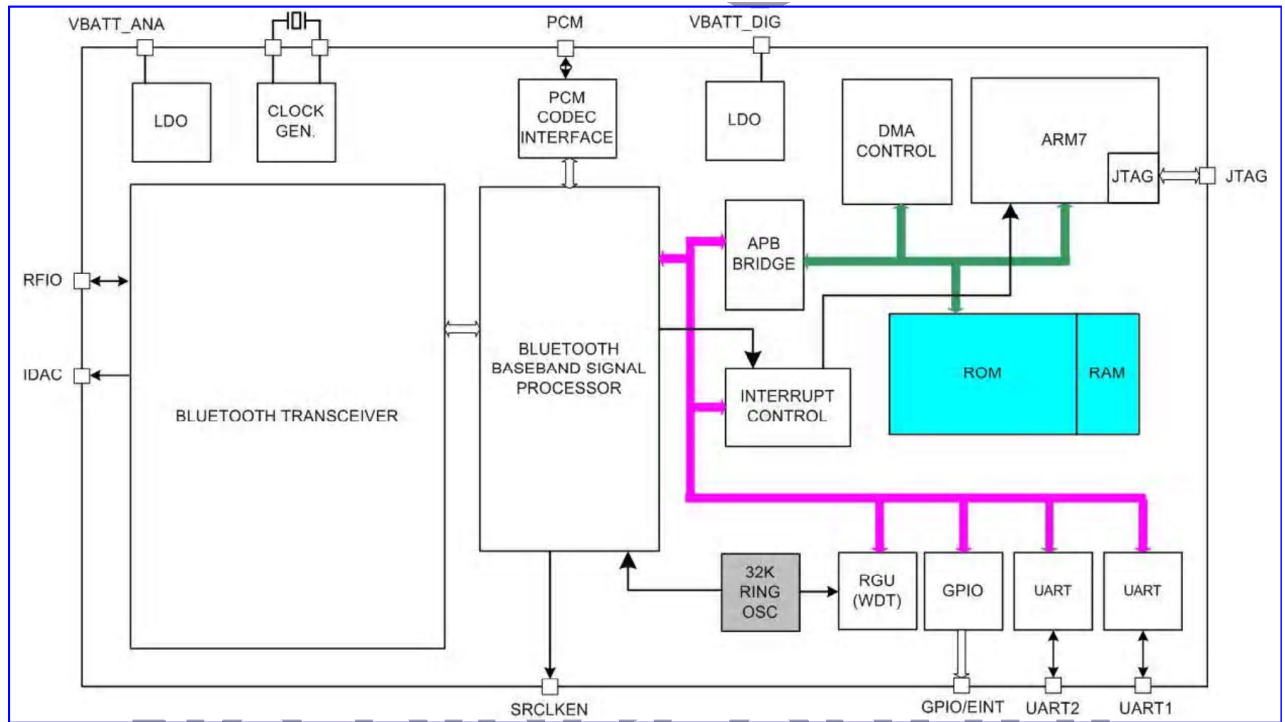


2. Pin List

Pin	Name	Description
1	BS	Band Select
2	VCC1A	VCC (to GSM 1st stage, DCS/PCS 1st stages, BiCMOS PAC)
3	DCS/PCS_IN	RF input 1710–1910 MHz (DCS1800, PCS1900)
4	GSM_IN	RF input 880–915 MHz (GSM)
5	GND	RF and DC Ground
6	VCC1B	VCC (to GSM 2nd stage, DCS/PCS 2nd stages)
7	GND	RF and DC Ground
8	GND	RF and DC Ground
9	GND	RF and DC Ground
10	GND	RF and DC Ground
11	GSM_OUT	RF Output 880–915 MHz (GSM)
12	GND	RF and DC Ground
13	GND	RF and DC Ground
14	GND	RF and DC Ground
15	DCS/PCS_OUT	RF Output 1710–1910 MHz (DCS1800, PCS1900)
16	GND	RF and DC Ground
17	VBATT	Battery input to high side of internal sense resistor
18	ENABLE	BiCMOS Enable
19	RSVD(GND)	RF and DC Ground
20	VAPC	Power Control Bias Voltage
GND PAD	GND	Ground Pad, device underside

5-3-7 Bluetooth

Function block diagram



Pin Sheet

NC(Not Connect) pin indication

A1	A2	A3	A4	A5	A6	A7	A8	A9
IDAC	VDD_RX	RX_IN	VDD_TX	VDD_MCG	XTAL_N	GPIO7	GPIO6	GPIO5
B1	B2	B3	B4	B5	B6	B7	B8	B9
VREFP_CAP	VREFN_CAP	AVSS	TX_OUT	MCG_CHG	XTAL_P	VDDK	GPIO4	EXT32K
C1	C2			C5	C6	C7	C8	C9
VDD_BB	GND_BB			AVSS	VSS	VSS	GPIO3	GPIO2
D1	D2		D4	D5	D6		D8	D9
VBATT_ANA	VDD_VCODIG		AVSS	AVSS	VBDRDY		VBATT_DIG	VDDP
E1	E2		E4	E5	E6		E8	E9
VDD_VCO	AVSS		AVSS	VSS	VSS		VSS	VDD_CORE
F1	F2		F4	F5	F6		F8	F9
CHG_PUMP	AVSS		VSS	VSS	VSS		PCMIN	PCMOUT
G1	G2	G3		G5			G8	G9
VSS	VDDK	TX_RX_N		URTS1			PCMSYNC	PCMCLK
H1	H2	H3	H4	H5	H6	H7	H8	H9
TESTMODE	JTCK	JTMS	JTDO	UCTS1	URXD1	URXD2	GPIO1	GPIO0
J1	J2	J3	J4	J5	J6	J7	J8	J9
SYSRST_B	JTRST_B	JTDI	VDDP	JRTCK	UTXD1	SRCLKENA	UTXD2	VSS

5-3-8 FM (radio)

MT6226 integrates a mixed-signal Baseband front-end in order to provide a well-organized radio interface with flexibility for efficient customization. It contains gain and offset calibration mechanisms, and filters with programmable coefficients for comprehensive compatibility control on RF modules. This approach also allows the usage of a high resolution D/A Converter for controlling VCXO or crystal, thus reducing the need for expensive TCVCXO. MT6226 achieves great MODEM performance by utilizing 14-bit high resolution A/D Converter in the RF downlink path. Furthermore, to reduce the need for extra external current-driving component, the driving strength of some BPI outputs is designed to be configurable. Function block diagram

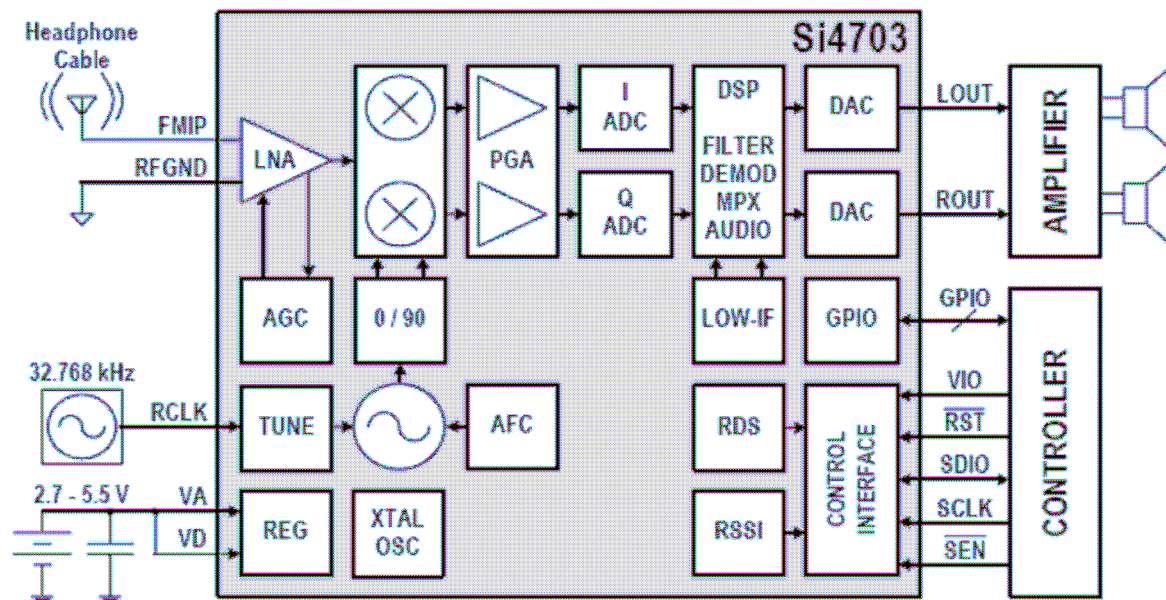
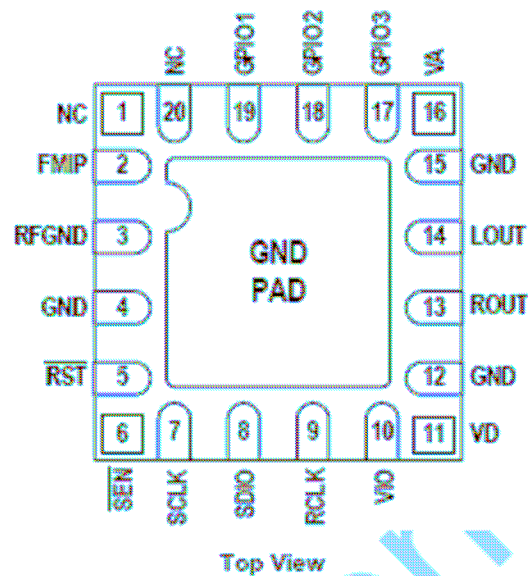


Figure 7. Si4703 FM Receiver Block Diagram

Pin sheet



Pin Number(s)	Name	Description
1, 20	NC	No Connect. Leave floating.
2	FMIP	FM RF inputs.
3	RFGND	RF ground. Connect to ground plane on PCB.
4, 12, 15, PAD	GND	Ground. Connect to ground plane on PCB.
5	RST	Device reset (active low) input.
6	SEN	Serial enable input (active low).
7	SCLK	Serial clock input.
8	SDIO	Serial data input/output.
9	RCLK	External reference oscillator input.
10	V _{IO}	I/O supply voltage.
11	V _D	Digital supply voltage. May be connected directly to battery.
13	ROUT	Right audio output.
14	LOUT	Left audio output.
16	V _A	Analog supply voltage. May be connected directly to battery.
17, 18, 19	GPIO3, GPIO2, GPIO1	General purpose input/output.

.5-3-9 Voice Band Interface

Outline

The audio system is composed of MT6226, PMU IC (MT6318). The attached device is MIC, Receiver, Speaker.

Audio Control

Speaker and Receiver interface

SPEAKER interface:

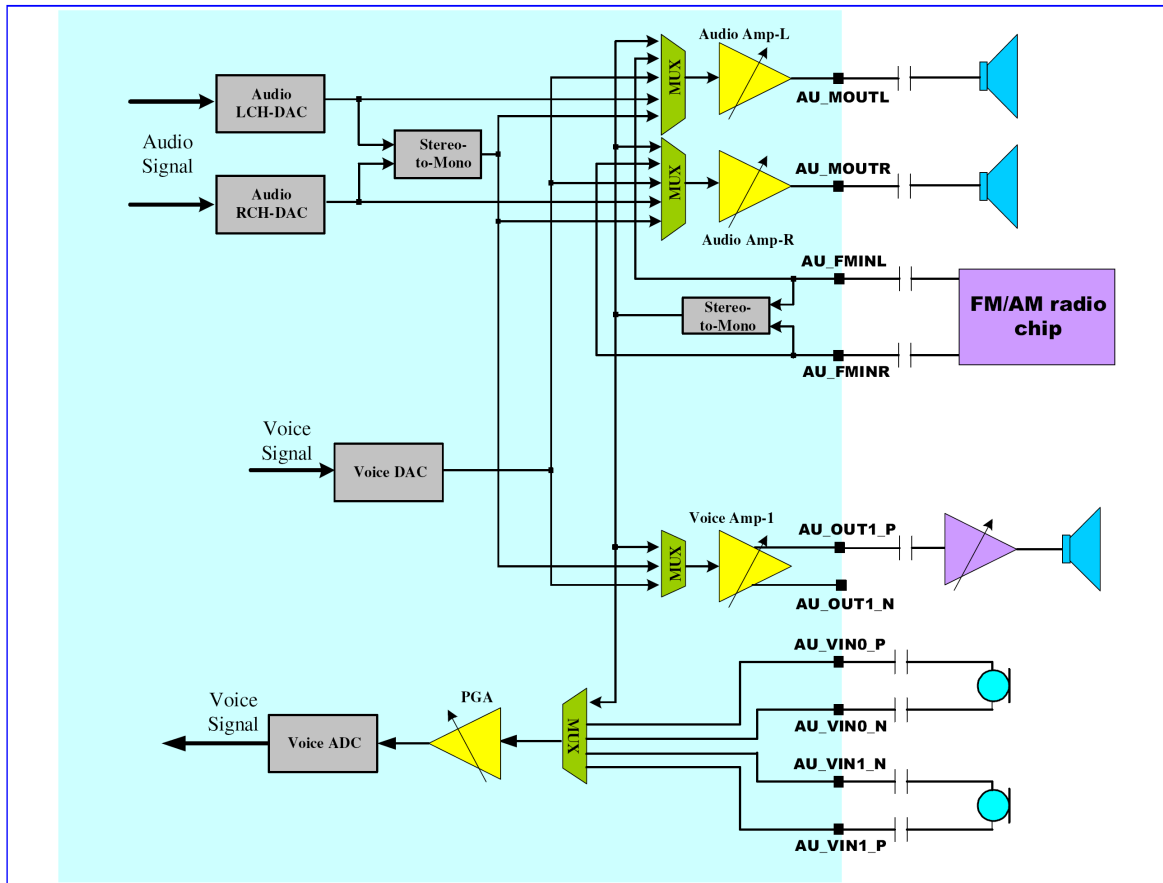
Use MT6318 internal AMP to amplify voice and voice signal from MP3_OUTL

The audio front-end essentially consists of voice and audio data paths. Figure 1 shows the block diagram of the audio front-end. The entire voice band data paths comply with the GSM 03.50 specification. In addition, Mono hands-free audio or external FM radio playback path are provided. The audio stereo audio path facilitates audio quality playback, external FM radio, and voice playback through headset.

Figure 2 shows the digital circuits block diagram of the audio front-end. The APB register block is an APB peripheral that stores settings from the MCU. The DSP audio port block interfaces with the DSP for control and data communications.

The digital filter block performs filter operations for voice band and audio band signal processing. The Digital Audio Interface (DAI) block communicates with the System Simulator for FTA or external Bluetooth modules.

Figure 1 Block diagram of audio front-end



2. Figure 2 Block Diagram of Digital Circuits of the Audio Front-End

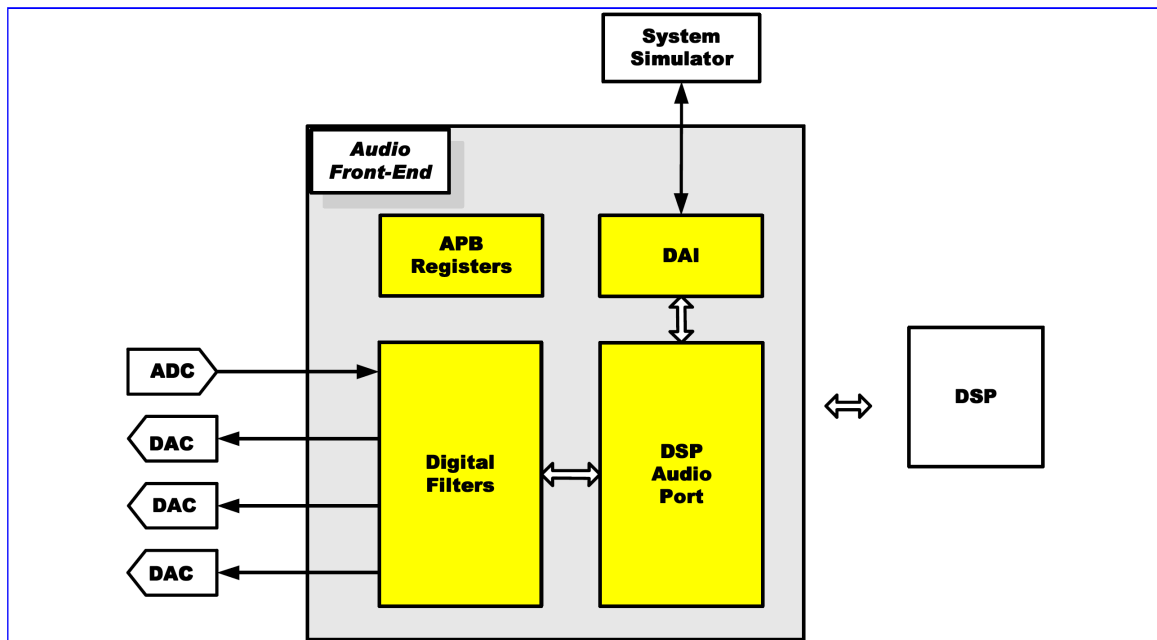


Figure 2

5-3-10 Monitor ADC

The following is 7339 ADC in use.

External ADC name	Purpose in 7339
ADC0_1-	Detect Battery Voltage and Current
ADC0_1+	Detect Battery Voltage and Current
ADC2_TBAT	Detect Battery tempter
ADC3_VCHG	Detect Charging voltage
ADC5_USB	Detect USB device
ADC6_ASS_ID	Detect hand free

5-3-11 BATTERY CHARGING

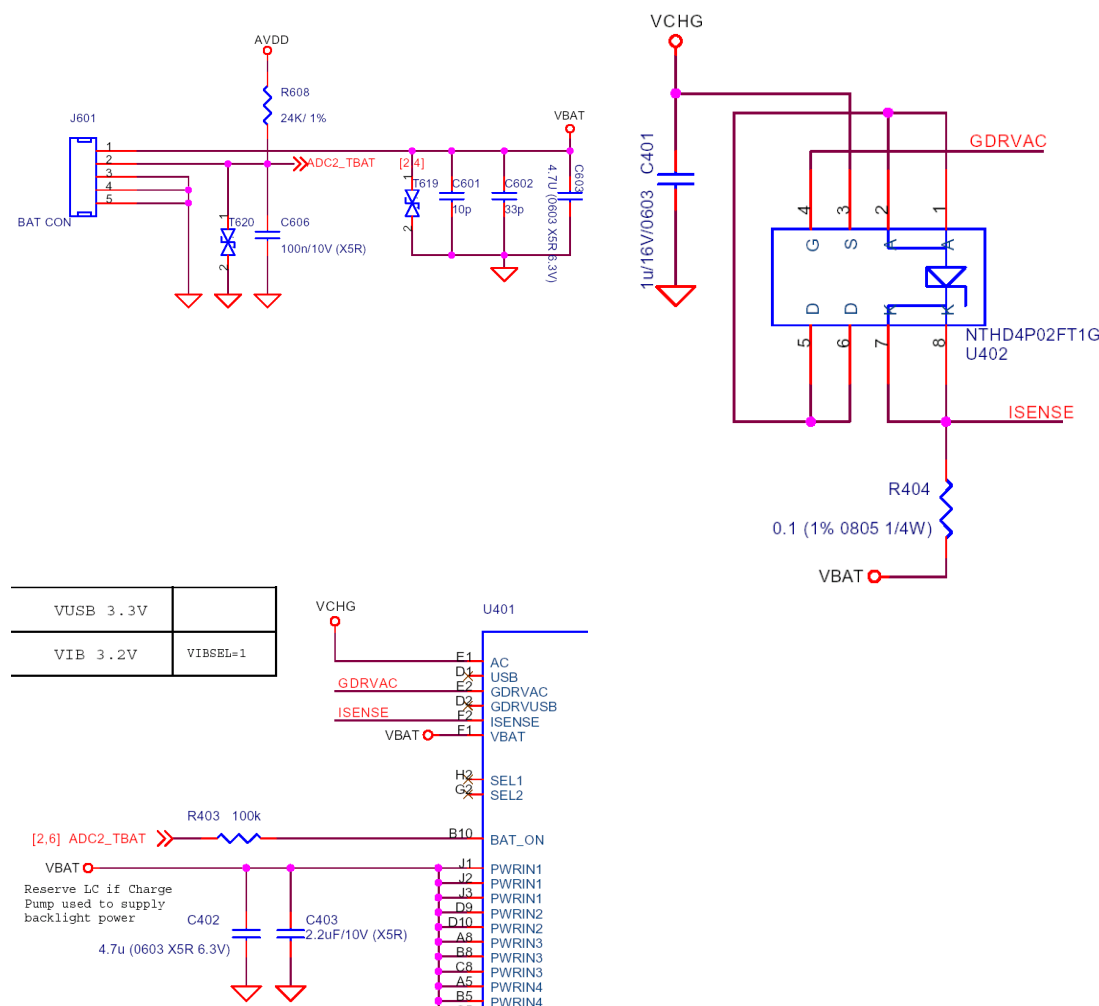
Battery management, which controls charge and discharge of the battery is the most important function for safety. KP199 SW performs charging algorithm. To regulate the power PMOS for set the charging current.

KP199 CHARGING CIRCUIT AND ALGORITHM

charging Circuit and Algorithm

KP199 Charging circuit:

The schematic below shows the external charging components used in the Arima 7339 project. All ports are directly connected to the corresponding pins of PMU IC (6318). VCHG is the V charger supply rail coming directly from the wall-plug constant voltage charger via the system connector, and VBAT is the Battery Voltage rail, connected directly to the battery pack terminal connector. The system uses a solid ground plane, and both the Battery Pack terminal and the wall-plug charger return paths are connected directly to ground.



Charger Sub-system

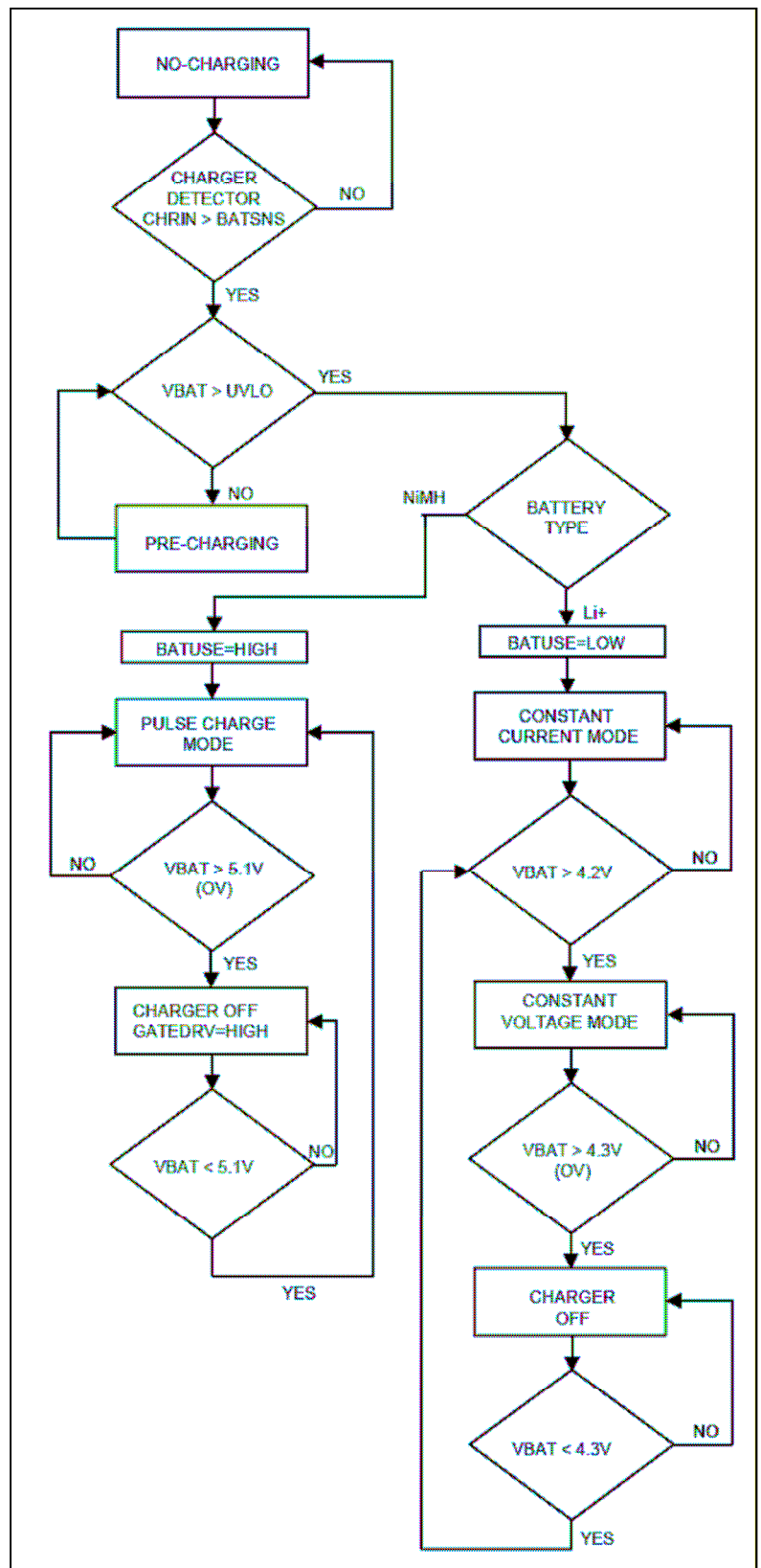
The MT6318 battery charger can be used with Li-ion and NiMH batteries. BATUSE pin can set MT6318 to fit the battery type. When BATUSE is set low, Li-ion battery is used. When BATUSE is set high, then NiMH battery is used. MT6318 charges the battery in three phases: pre-charging, constant current mode charging, and constant voltage mode charging. Figure 2 shows the flow chart of charger behavior. The circuitry of MT6318 combines with a PMOS transistor, diode and current-sense resistor externally to form a simple and low cost linear charger shown in Figure 3. MT6305 is available pulsed top-off charging algorithm by the CHRCNTL pin control from baseband chipset.

Charge Detection

The MT6318 charger block has a detection circuit that determinates if an adapter has been applied to the CHRIN pin. If the adapter voltage exceeds the battery voltage by 3.75%, the CHRDET output will go high. If the adapter is then removed and the voltage at the CHRIN pin drops to only 2.5% above the VBAT pin, CHRDET goes low.

Pre-Charging mode

When the battery voltage is below the UVLO threshold, the charge current is in the pre-charging mode. There are two steps in this mode. While the battery voltage is deeply discharged below 2V, a 10mA trickle current of MT6318 charges the battery internally. When the battery voltage exceeds 2V, the pre-charge current is enabled, which allows 10mV (typically) across the external current sense resistor. This pre-charge current can be calculated:



Constant Current Charging Mode

Once the battery voltage has exceeded the UVLO threshold the charger will switch to the constant current charging mode. The MT6318 allows 160mV (typically) across the external current sense resistor. This constant current can be calculated.

$$I_{\text{PRE_CHARGING}} = \frac{V_{\text{SENSE}}}{R1} = \frac{10\text{mV}}{R1}$$

If the voltage of Li-ion battery is below 4.2V (5.1V for NiMH battery), the battery will be in the constant current charging mode.

$$I_{\text{CONSTANT}} = \frac{V_{\text{SENSE}}}{R1} = \frac{160\text{mV}}{R1}$$

Constant Voltage Charging Mode

This mode is only applied to Li-ion battery charging. If the battery has reached the final charge voltage, a constant voltage is applied to the battery and keeps it at 4.2V. The charge termination is determined by the baseband chip internally, which will pull the CHRCNTL low to stop the charger. Once the battery voltage exceeds 4.3V of Li-ion battery (5.1V of NiMH battery), a hardware over voltage protection (OV) should be activated and turn off the charger block of MT6318.

Pulsed Charging Algorithm

MT6305 is available to pulsed top-off charging algorithm by the CHRCNTL pin. The control signal is from baseband chipset to limit the charging duty cycle. This charging algorithm combines the efficiency of switch-mode chargers with the simplicity and low cost of linear chargers.

Battery Voltage Monitor

As the Table 2 shown, the relations of battery voltage and charger control signals are listed. When Vbat < 3.2V, an UVLO signal is active low. When Vbat >= 4.3, an OV signal is active and terminates charging. The disconnection of battery could be detected by BATDET pin. BATDET is pulled high internally when battery disconnected and terminates charging immediately.

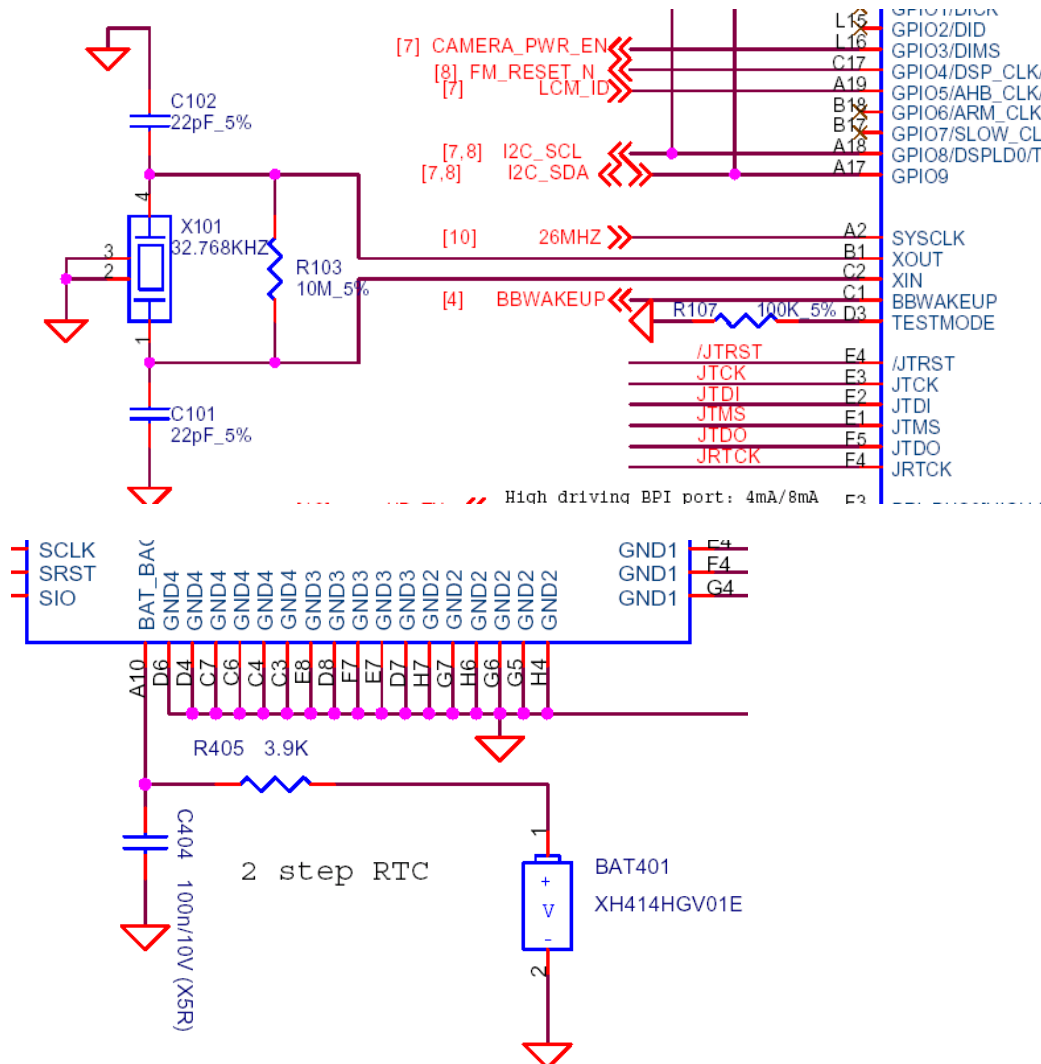
Vbat	CHRON	CHRCNTL	CHRDET	-UVLO	BATUSE	Charger Condition
Any Vbat	L	X	L	X	X	No-Charging
Vbat > 3.2V	X	L	X	X	X	No-Charging
Vbat < UVLO	H	X	L	L	X	Pre-Charging
3.2V < Vbat < 4.2V	H	H	H	H	L	CC mode
Vbat = 4.2V	H	H	H	H	L	CV mode
3.2V < Vbat	H	H	H	H	H	CC mode

Notes: OV terminates charging at 4.3V for Li-ion battery or 5.1V for NiMH battery.

5-3-12 . REAL-TIME CLOCK (RTC)

RTC is the feature to count “second”.

MTK6226's clock generation on 32.768kHz is made by OSC(X101 in 7339), connecting to OSC32K_IN/ OSC32K_OUT and supply the clock from MT6318.



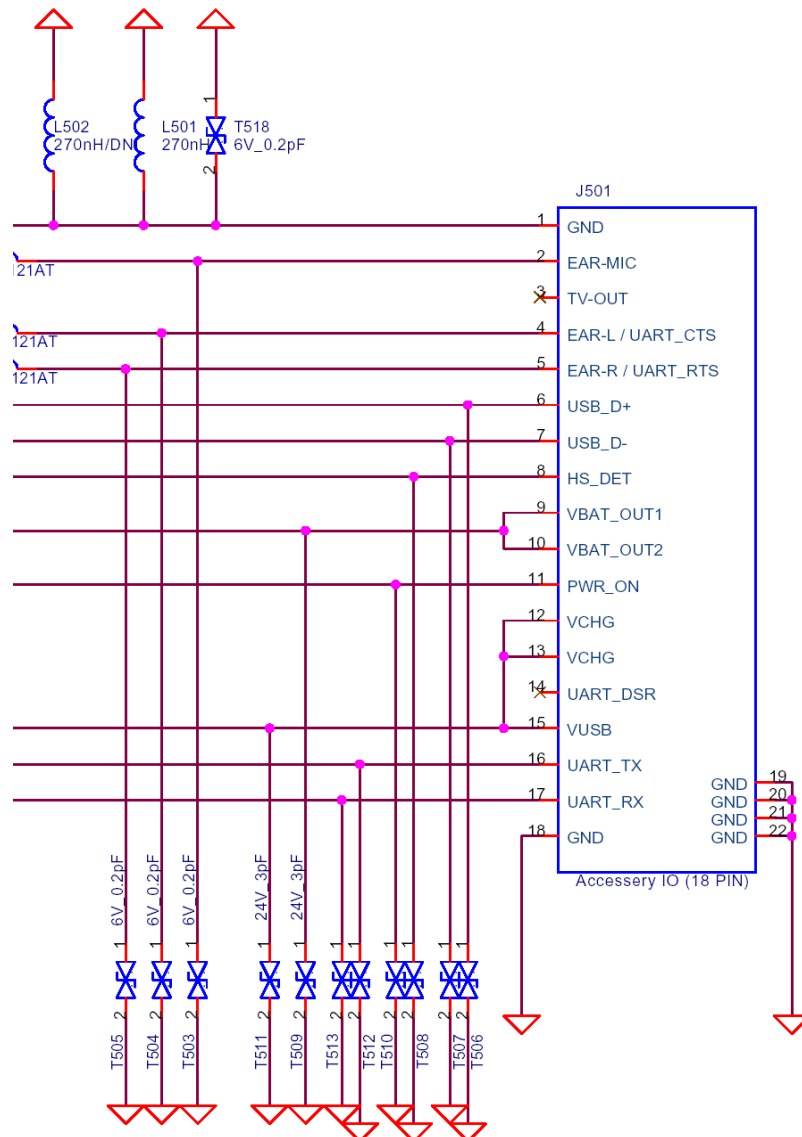
The real-time clock (RTC) is driven by a 32.768 kHz clock from a crystal oscillator. The input clock is divided by 32.768 to generate a clock with a 1 second period. In addition, it can generate interrupts at a programmed time. The following are basic function of RTC:

- Time information (seconds/minutes/hours) coded in BCD
- Calendar information (Day/Month/Year/Day of the week) directly in BCD code up to year 2099.
- Alarm function with interrupts generation bases on a periodical (second/minute/hour/day) or a precise time event in the century (second accuracy).
- 30s time range correction
- 32khz oscillator frequency gauging.

The RTC module of 7339 is supplied by 3V Backup Battery made by Seiko.
The target of running time of the backup battery (fully charged) is longer than two hours after the main battery is removed.

5-3-13 EXTERNAL INTERFACE

The pin arrangement of system I/O is shown below.



5-3-14. SIM INTERFACE

The SIM interface module within MTK6226 allows access to the subscriber identity module smart card. With the appropriate software and level conversion by MT6318, the interface is compliant with GSM 11.11 and GSM 11.12.

The electrical interface consists of five signals:

SIMVCC

This output connects to contact C605 (VCC) of the SIM connector. It is used to supply power to the SIM card and is supplied directly from MT6318.

It is controlled by MT6318, and enable the power and 3V operation respectively. Note that while SIMPWR is low, the software sets SIMRST, SIMCLK and SIMDATA signals low.

SIMRST

This output connects to contact T618 (RST) of the SIM connector. It is set directly by the CPU writing to the SIM control register.

SIMCLK

This output connects to contact T617 (CLK) of the SIM connector. The clock may be set high or low, or a choice of 13/4 MHz or 13/12 MHz clock frequencies may be selected, by writing to the SIM control register. In order to save power, the clock should be stopped when not required, if the SIM allows it.

SIMDATA

This is a bi-directional, open drain signal, connected to contact T615 (I/O) of the SIM connector. Control of the data signal is done in the SIM interface section of MT6226, although the output can be disabled by writing to the SIM control register. Being open-drain with an external pull-up, the output floats high when not being driven low by either Trident-HP or the SIM card.

All the above control signals maintain their state when MTK6226 is powered down. This allows the SIM to remain powered during soft-OFF. SIMPWR should be switched OFF when handset 'hard-OFF' mode is selected.

5-3-16. DISPLAY SYSTEM

TFT LCD Module

1. General Description

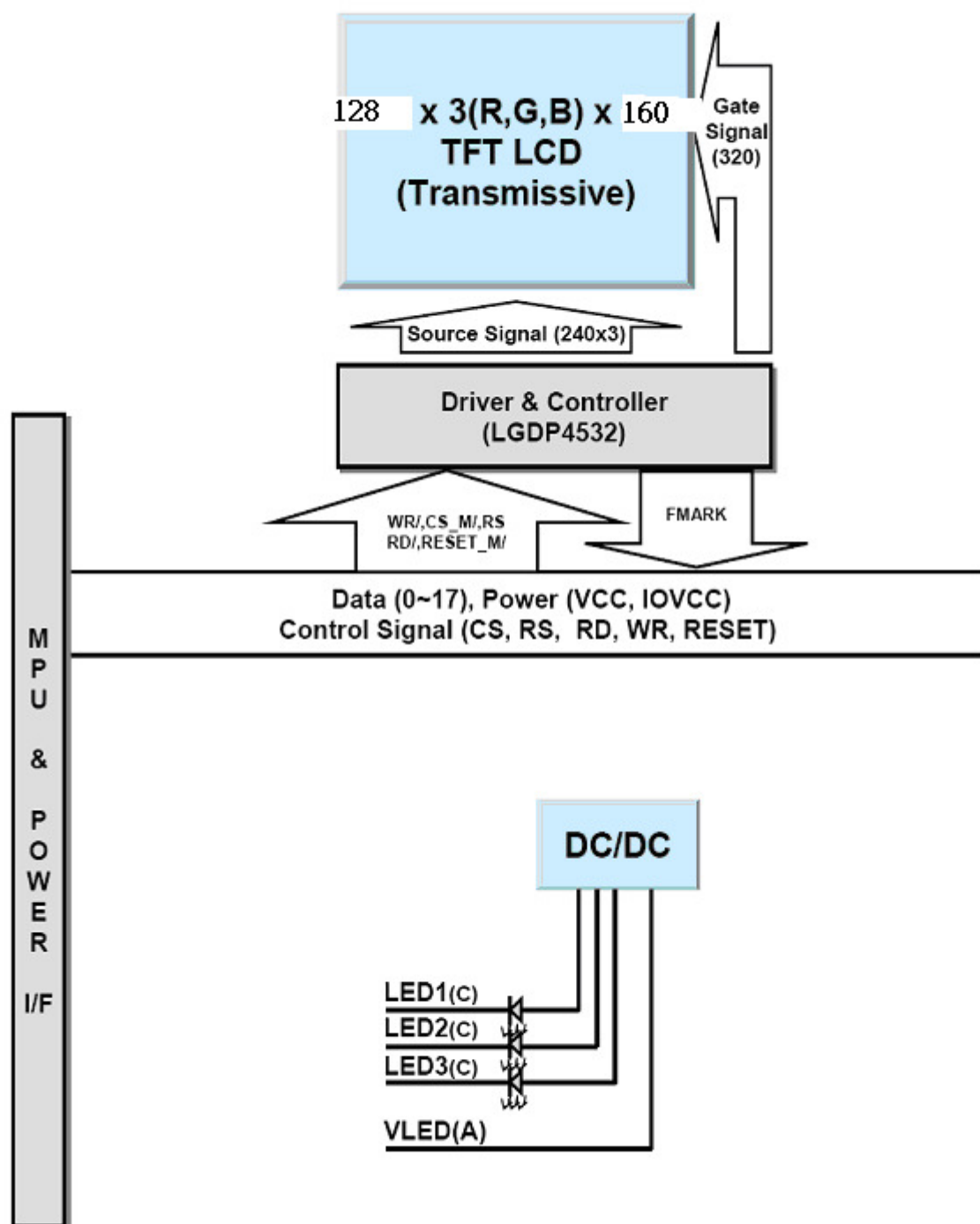
The **IM177BBNBB** model is a Color TFT LCD supplied by LG Innotek.
This Module has a 1.77 inch diagonally measured active display area with 128(RGB)X160 resolution
Each pixel is divided into Red, Green and Blue sub-pixels and dots which are arranged in vertical stripes.

LCD color is determined with 262K Colors signal for each pixel.
The **IM177BBNBB** has been designed to apply the interface method that enables low power, high speed, and high contrast.
The **IM177BBNBB** is intended to support applications where thin thickness, wide viewing angle and low power are critical factors and graphic displays are important.

2. General Features

Item	Main Display	Remark
Display Mode	Normally White, Transmissive LCD	
Driving Method	TFT Active Matrix	
Input Signals	8bit CPU I/F Parallel	
Outside Dimensions	33.9mm(W) x 46.4mm(H) x 2.1mm(D) (Typ.)	
Active Area	28.032mm(W) X 35.04mm(H)	
Number of Pixels	128×RGB×160 Pixels	Note 1)
Pixel Pitch	0.219mm(H) X 0.219mm(W)	Note 1)
Pixel Arrangement	RGB Vertical stripes	Note 1)

LCD interface



5-3-17 RF Sub-systems (MT 6139)

Function block diagram

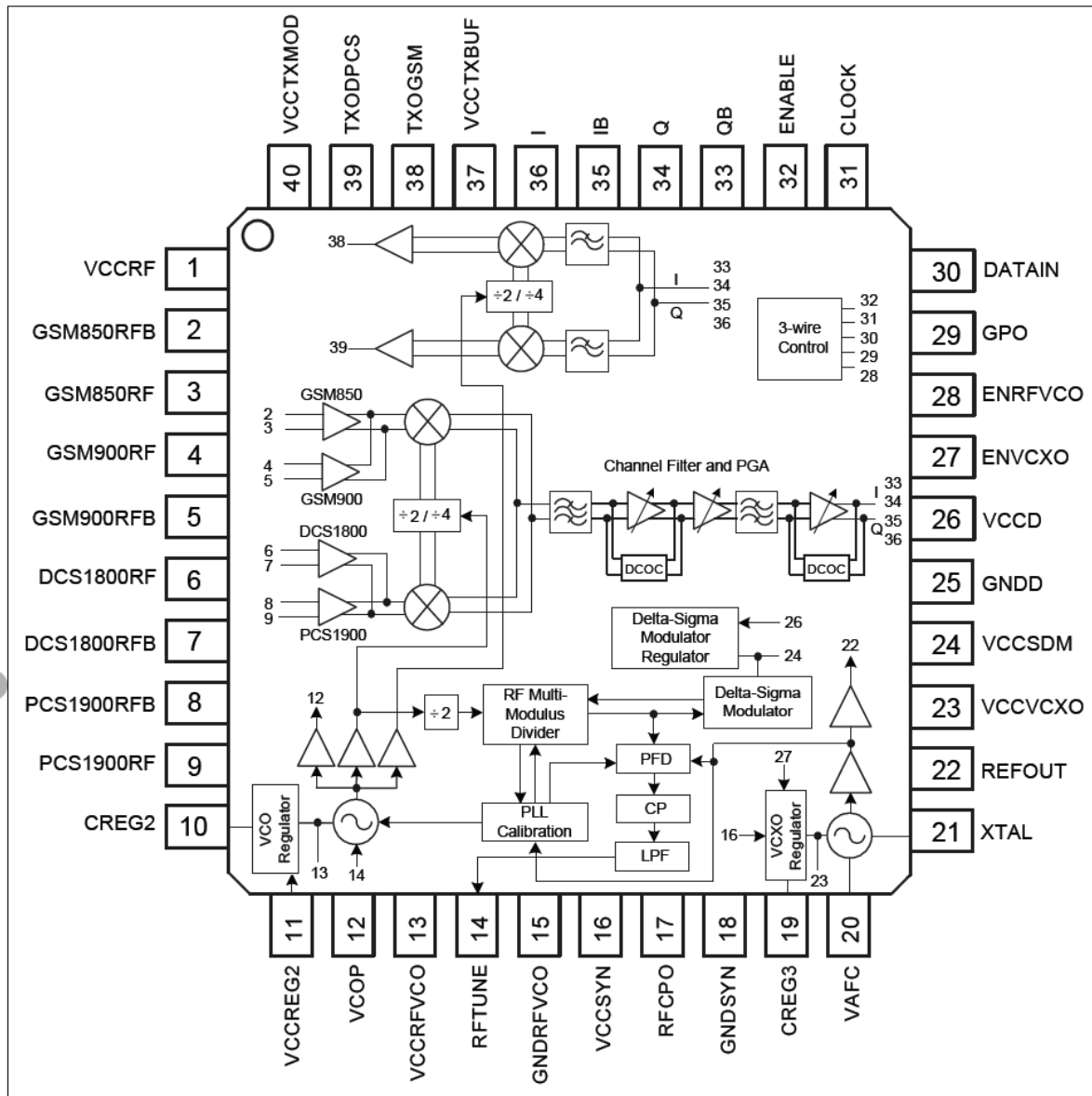
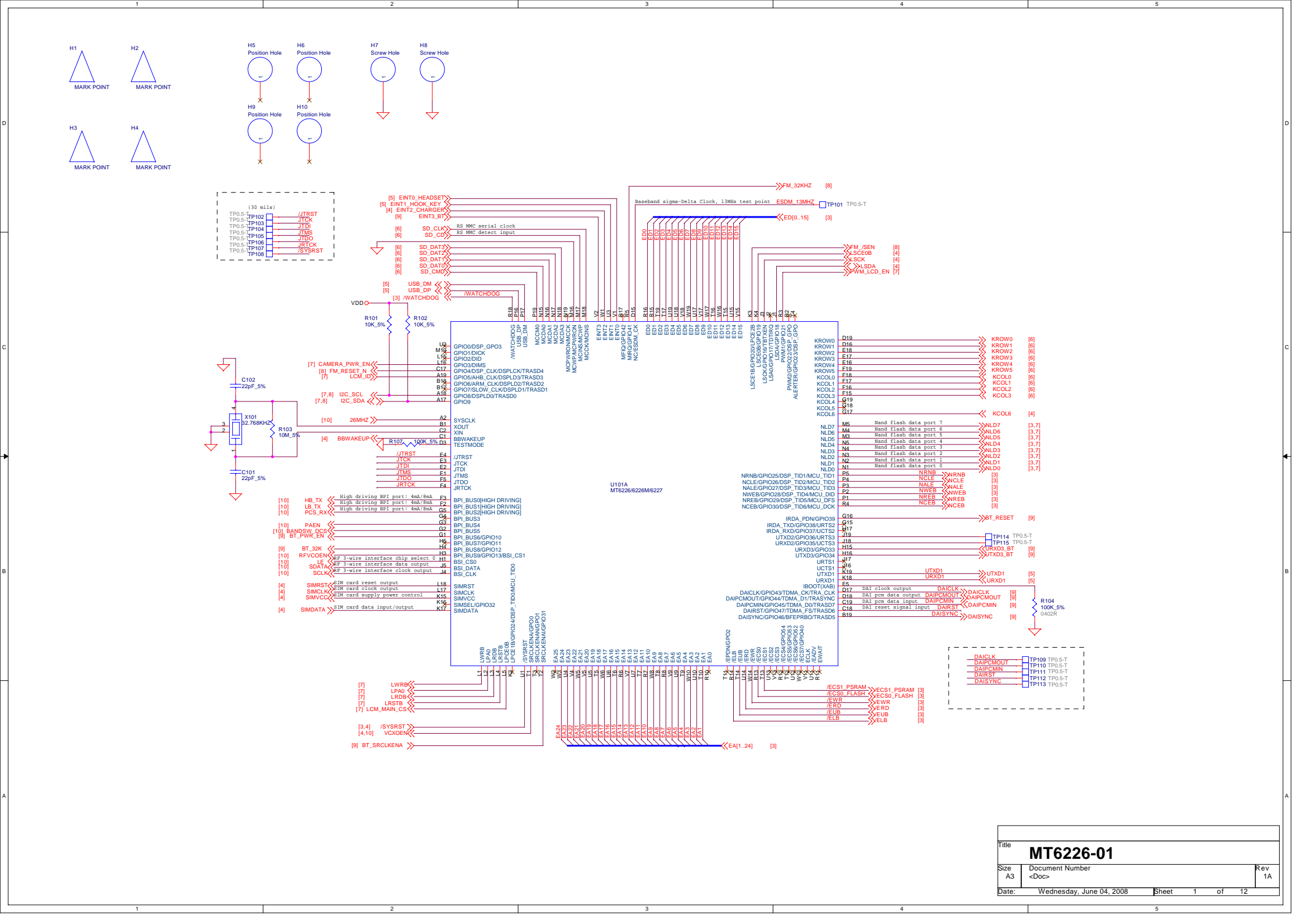
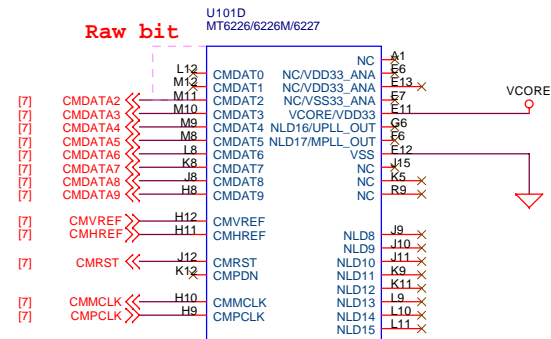
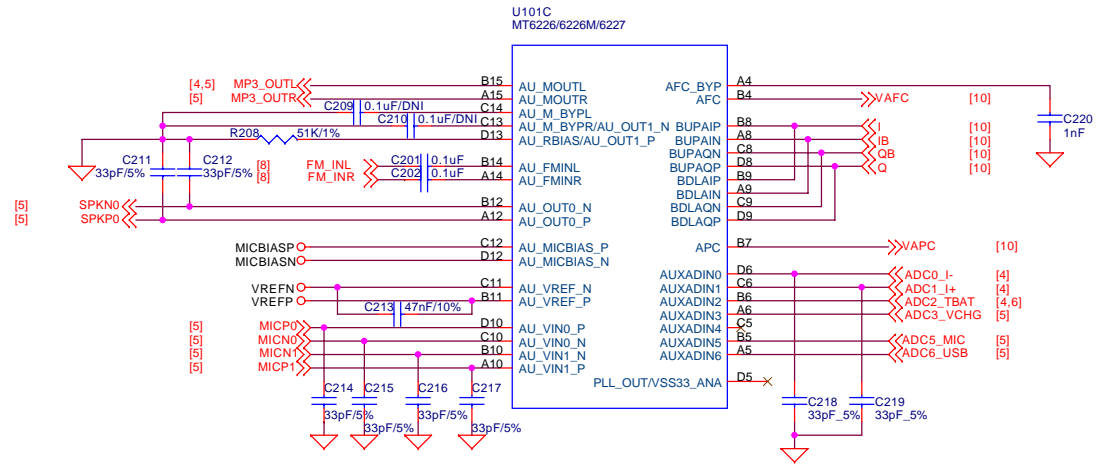
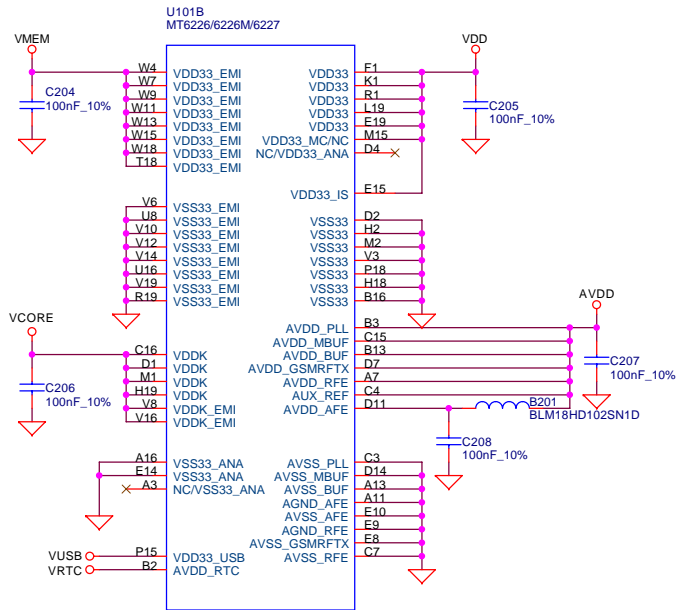


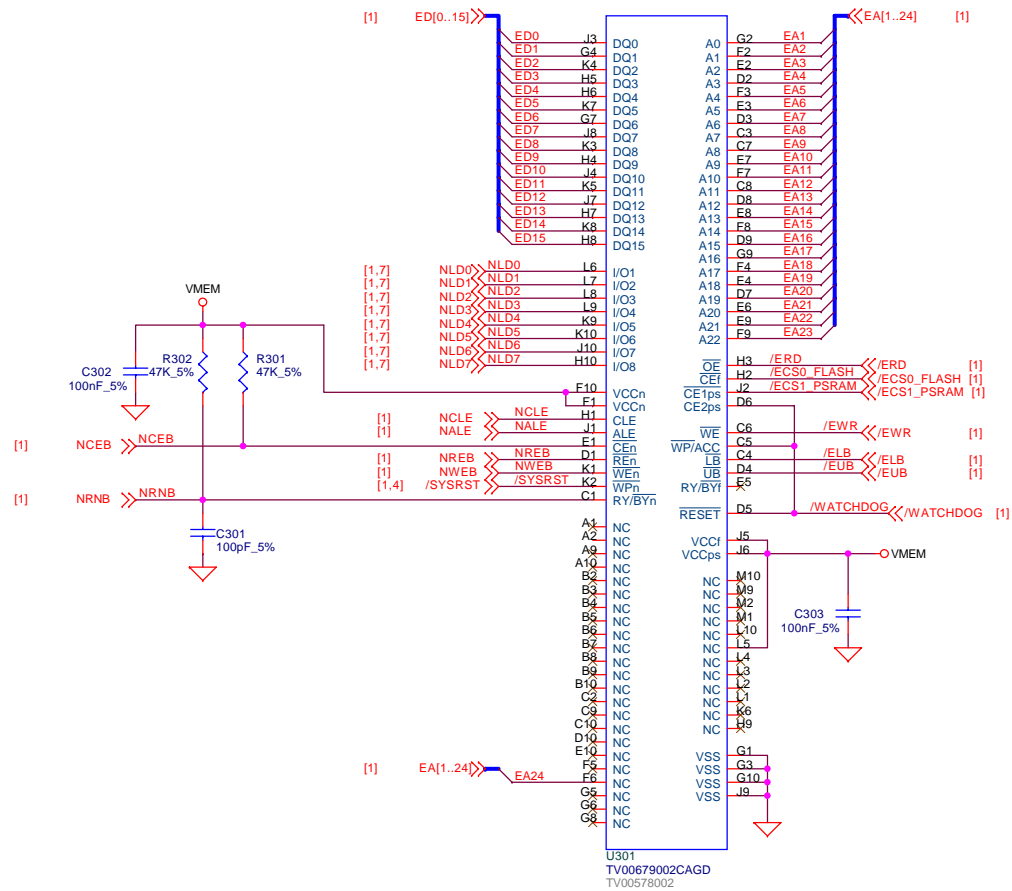
Figure 1 MT6139 Functional Block Diagram

5-4 CIRCUIT DIAGRAM & COMPONENT DIAGRAM



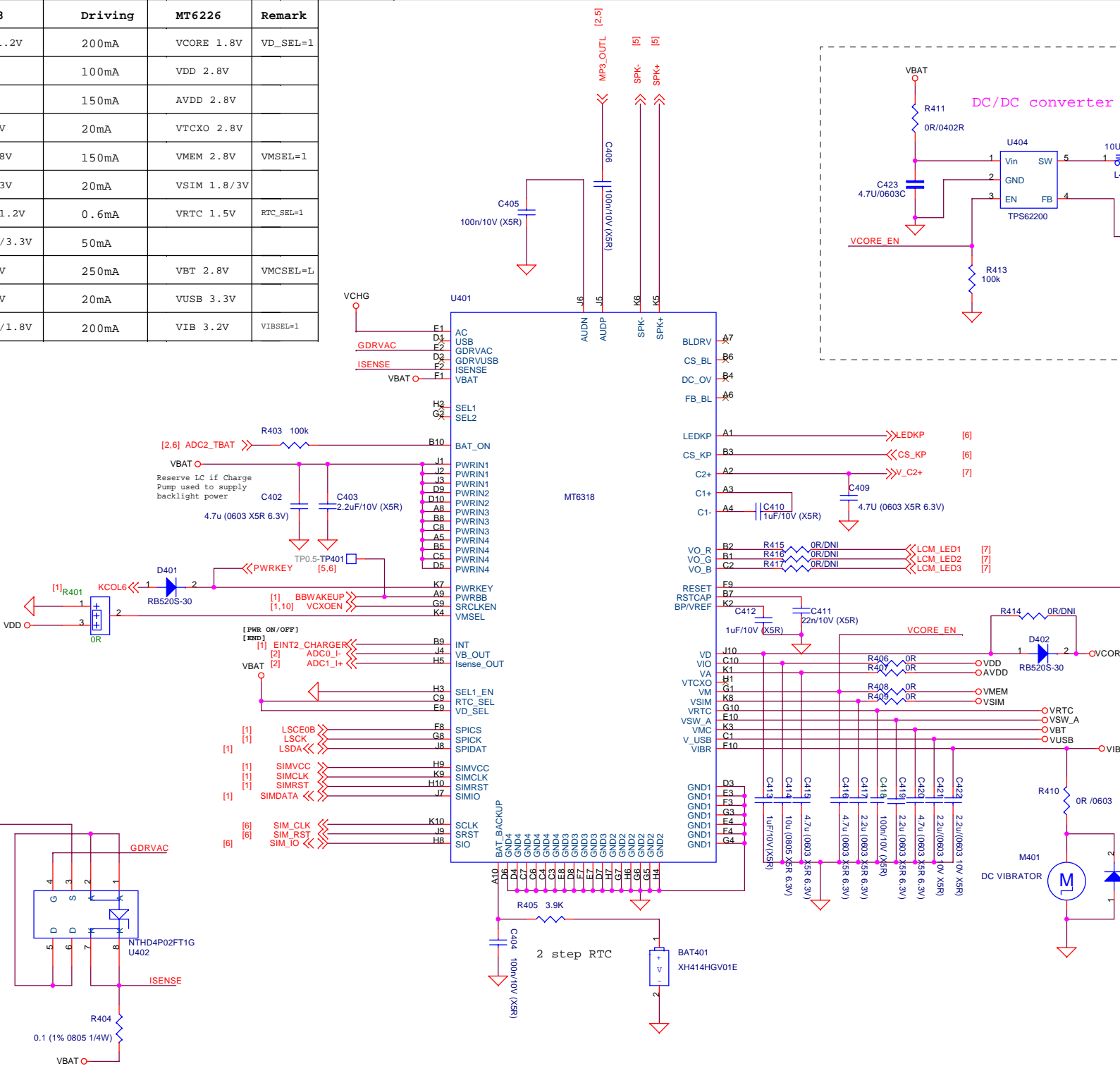
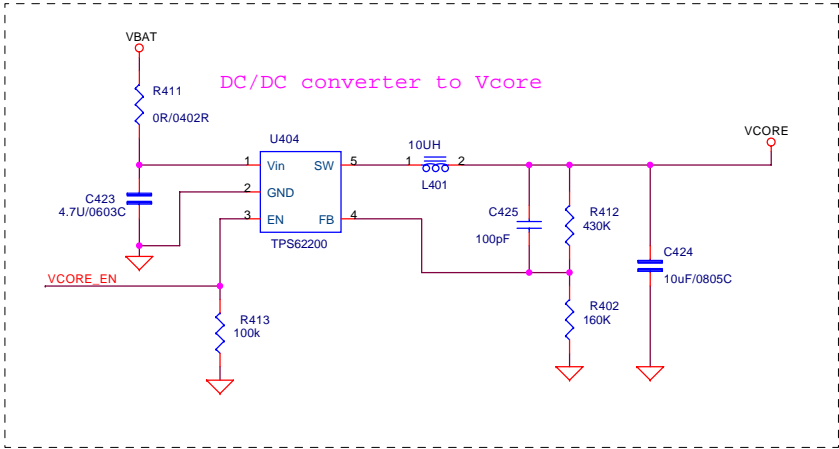


TOSHIBA MCP **TV00679002CAGD 128M+64M+512M**

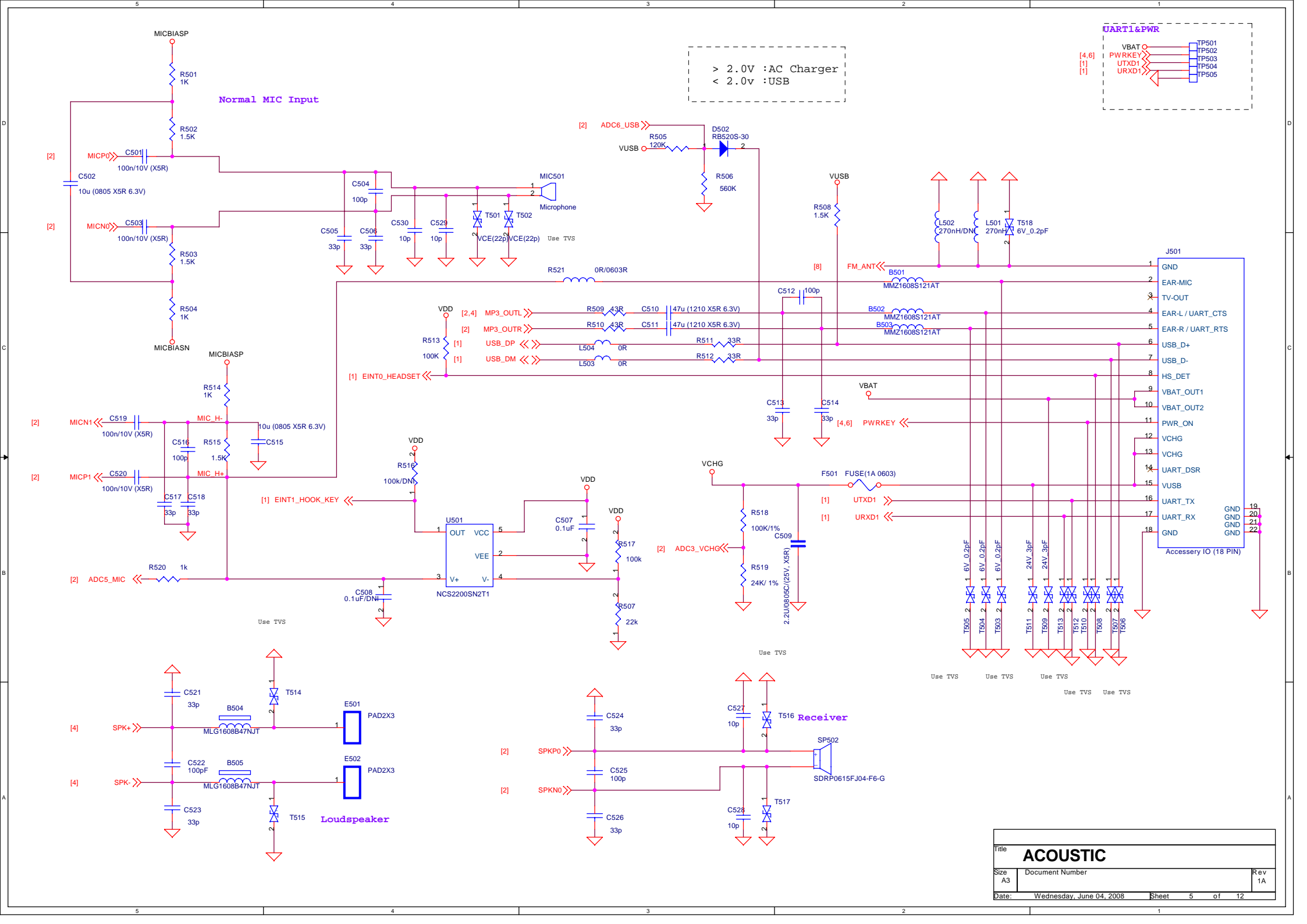


Title			MCP
Size	Document Number	Rev	
A3	<Doc>	1A	
Date:	Wednesday, June 04, 2008	Sheet	3 of 12

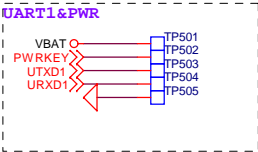
MT6318	Driving	MT6226	Remark
Vcore 1.8/1.2V	200mA	VCORE 1.8V	VD_SEL=1
VIO 2.8V	100mA	VDD 2.8V	
VA 2.8V	150mA	AVDD 2.8V	
VTXCO 2.8V	20mA	VTXCO 2.8V	
VM 2.8/1.8V	150mA	VMEM 2.8V	VMSEL=1
VSIM 1.8/3V	20mA	VSIM 1.8/3V	
VRTC 1.5/1.2V	0.6mA	VRTC 1.5V	RTC_SEL=1
VSW_A 2.8/3.3V	50mA		
VMC 2.8/3V	250mA	VBAT 2.8V	VMCSEL=L
V_USB 3.3V	20mA	VUSB 3.3V	
VIBR 3.2V/1.8V	200mA	VIB 3.2V	VIBSEL=1



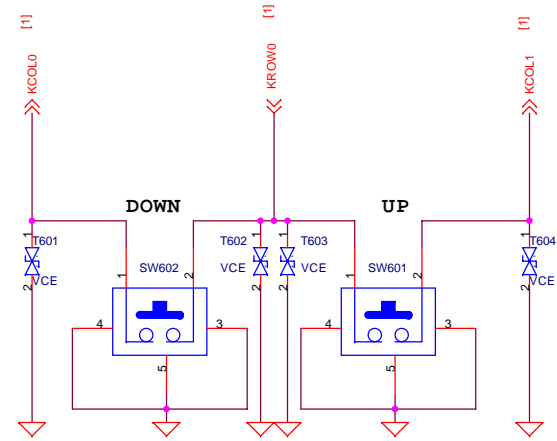
Title		
PMIC		
Size	Document Number	Rev
A3	1A	1A
Date:	Wednesday, June 04, 2008	Sheet 4 of 12



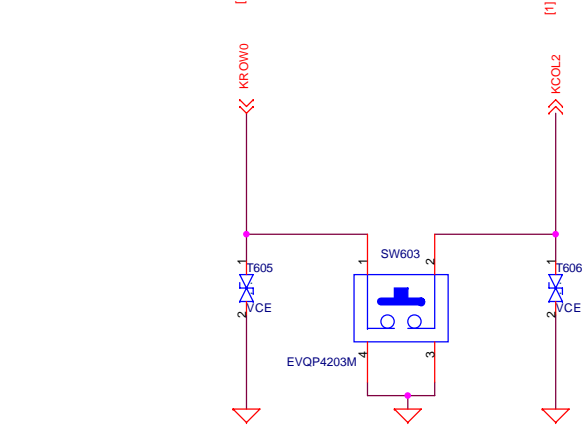
> 2.0V :AC Charger
< 2.0V :USB



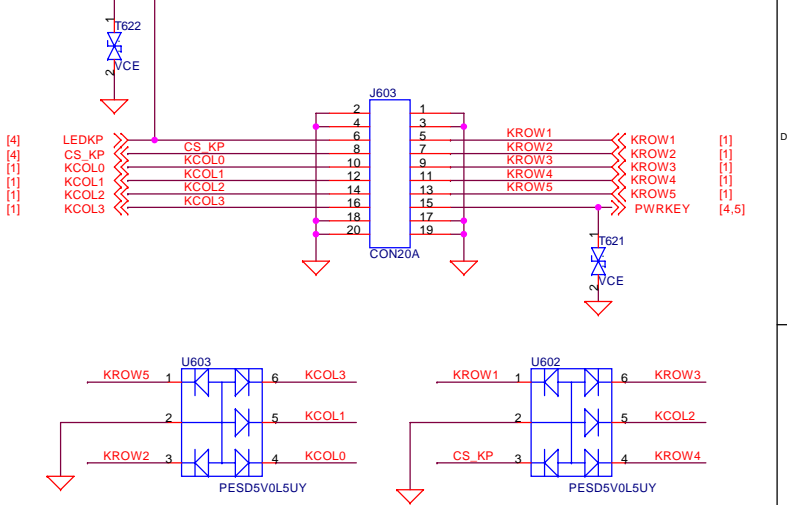
VOLUME KEY



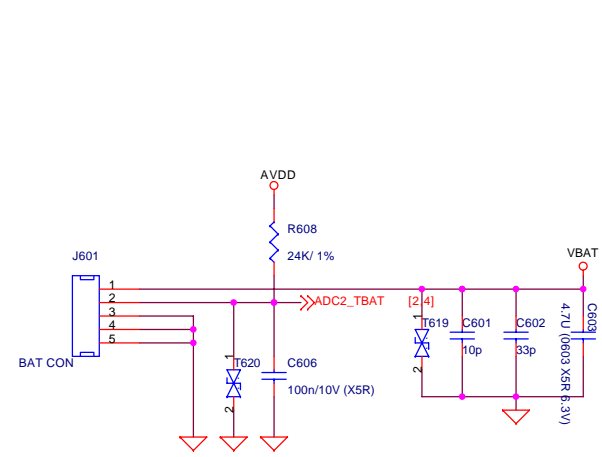
CAMERA KEY



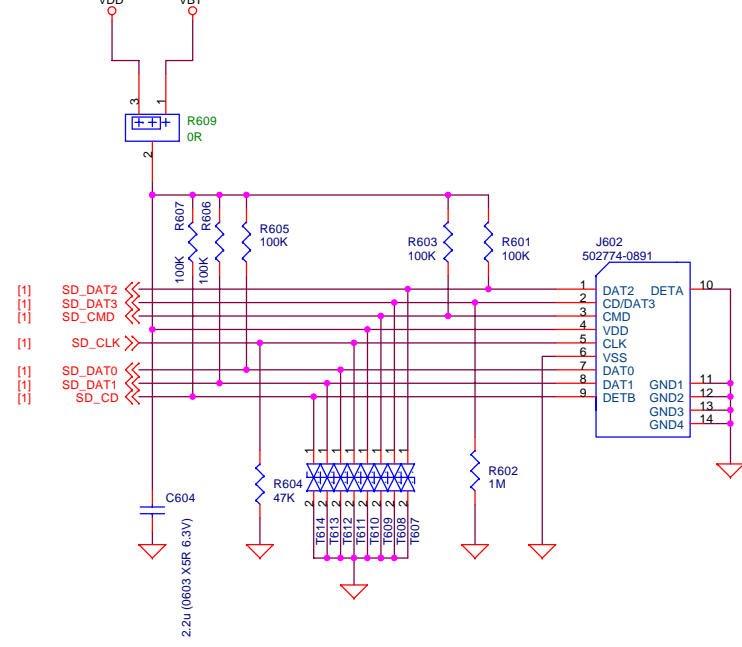
KEYBOARD CONNECTOR



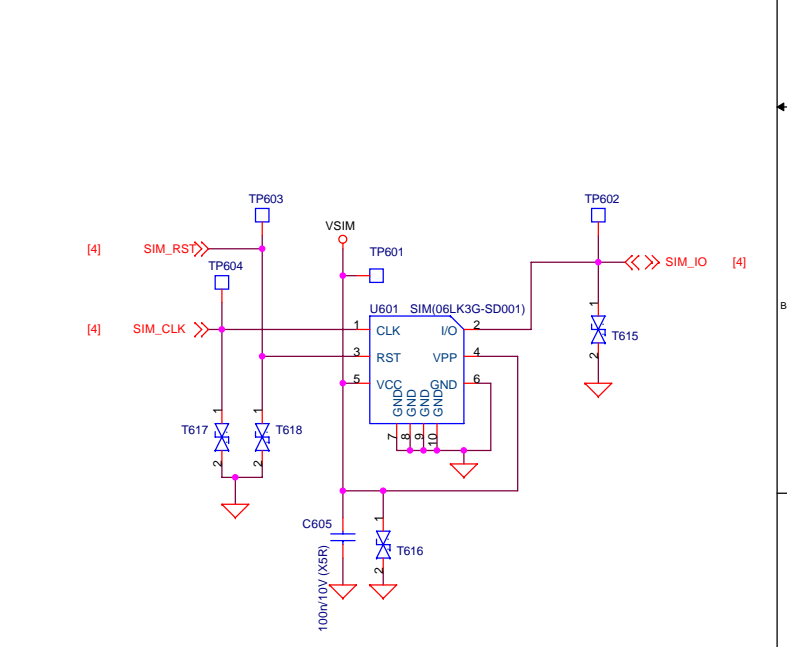
BAT CONNECTOR



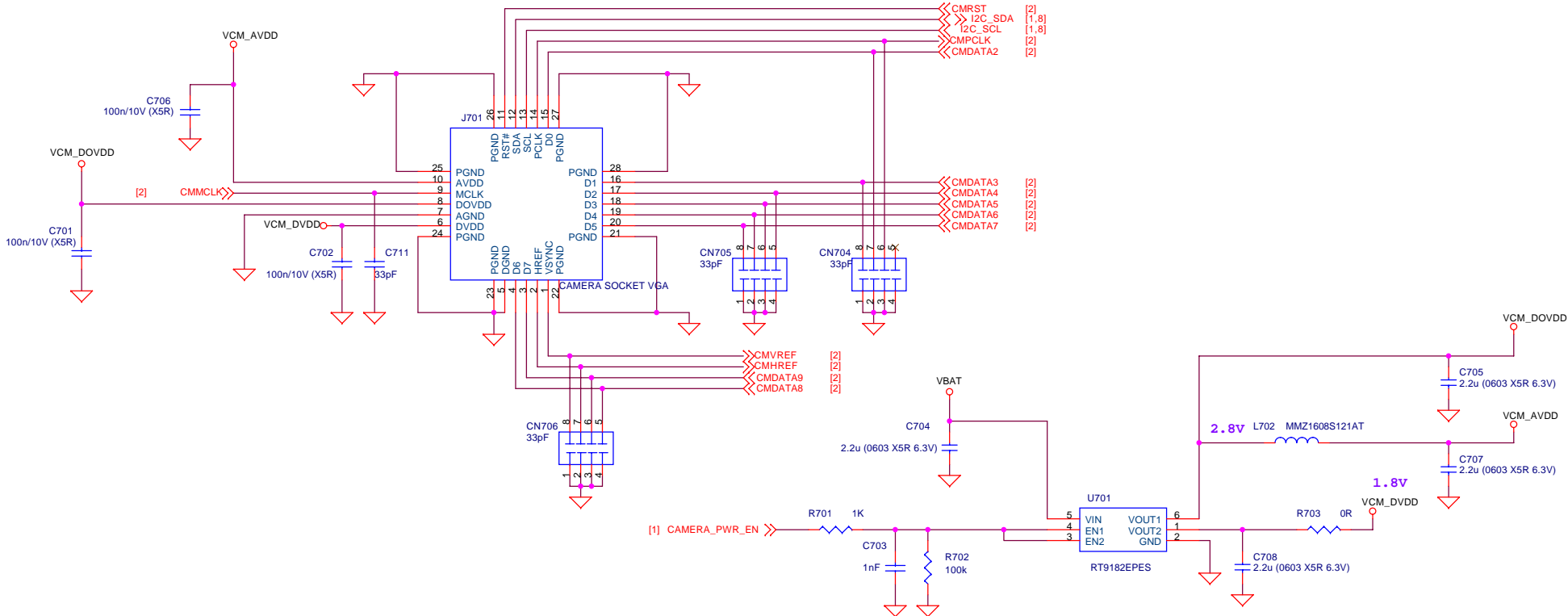
T-FLASH



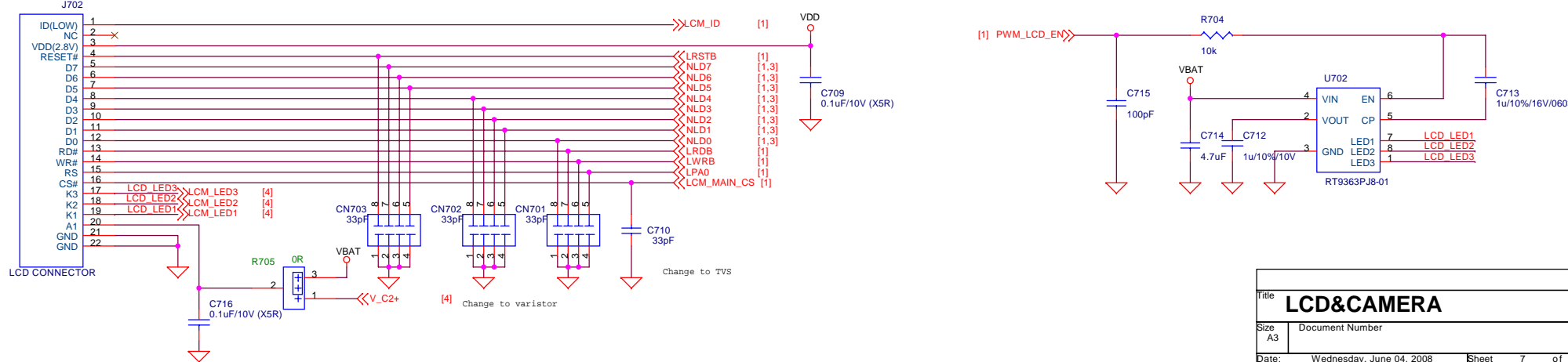
SIM CARD



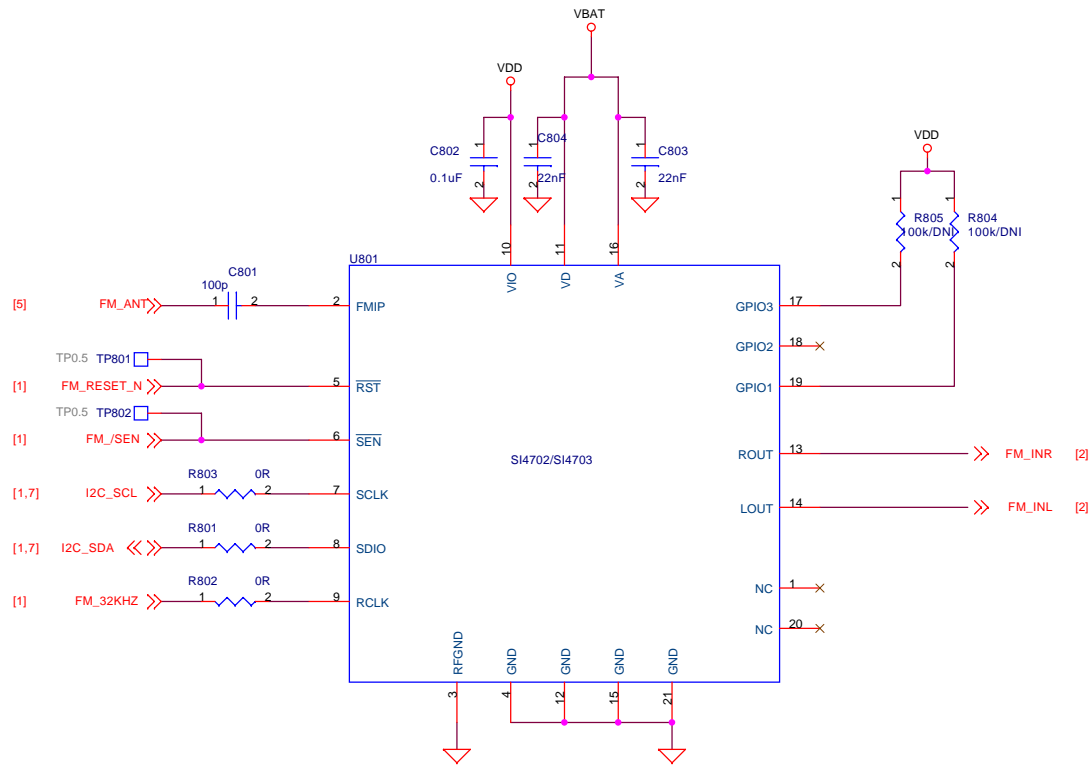
CAMERA

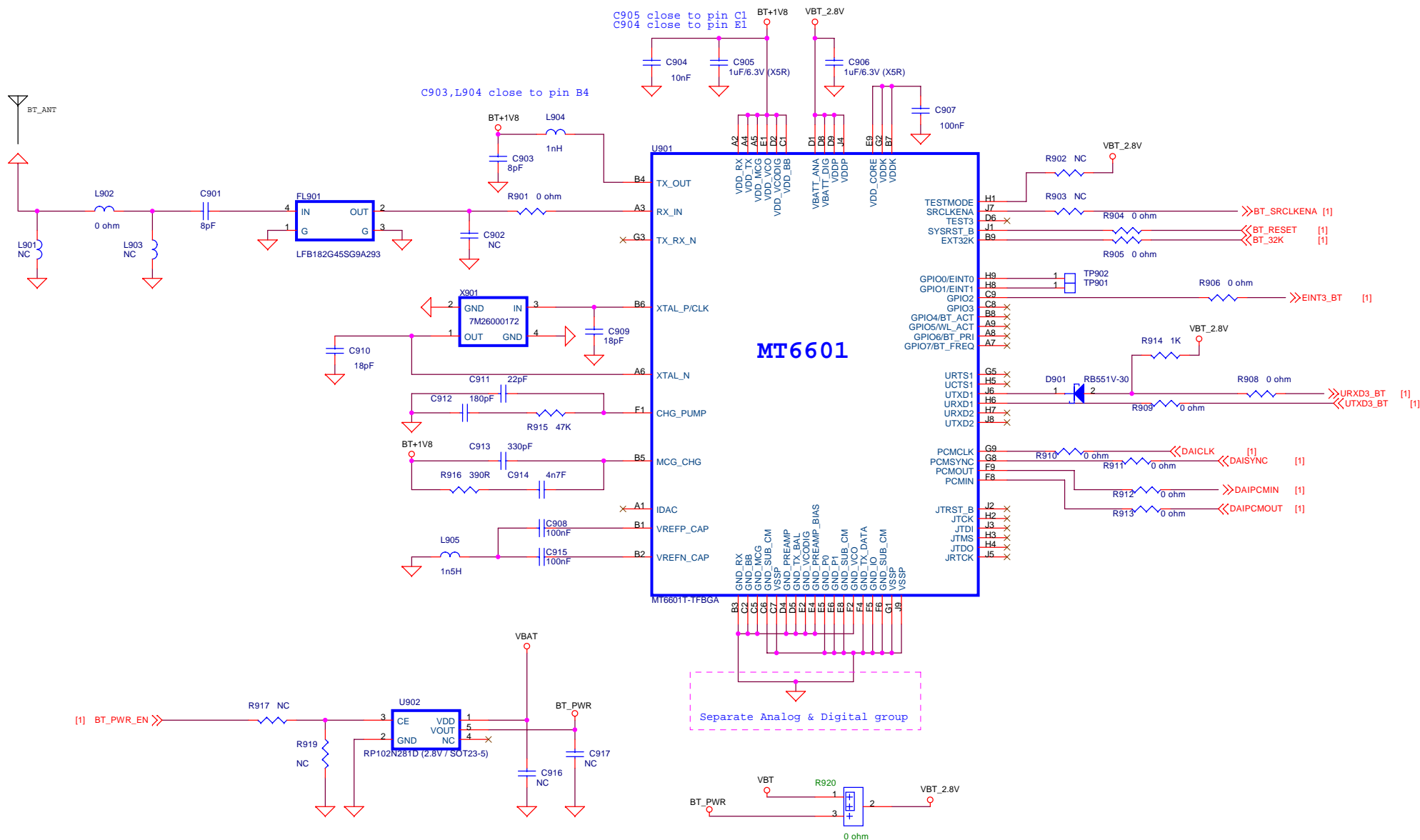


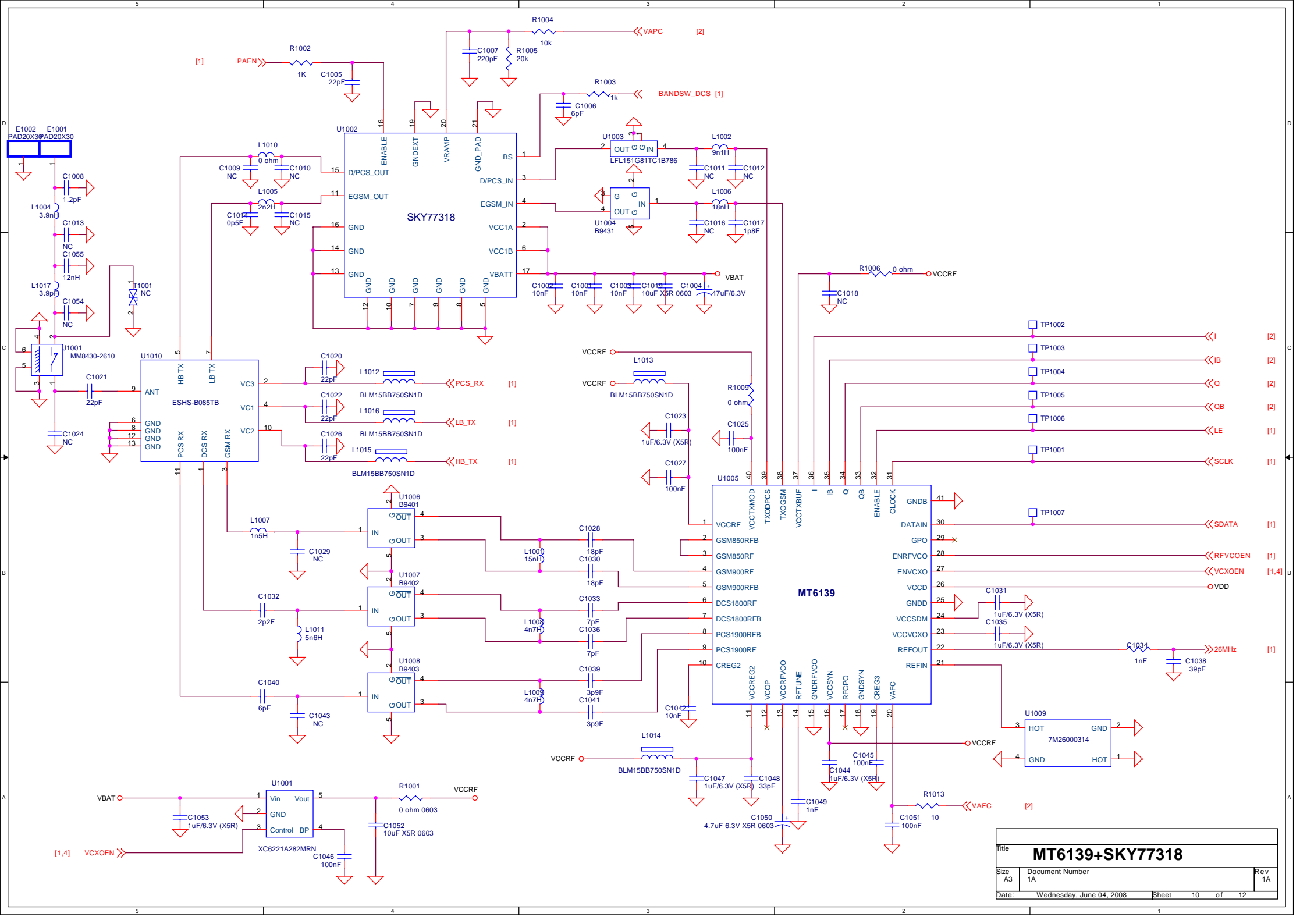
LCD

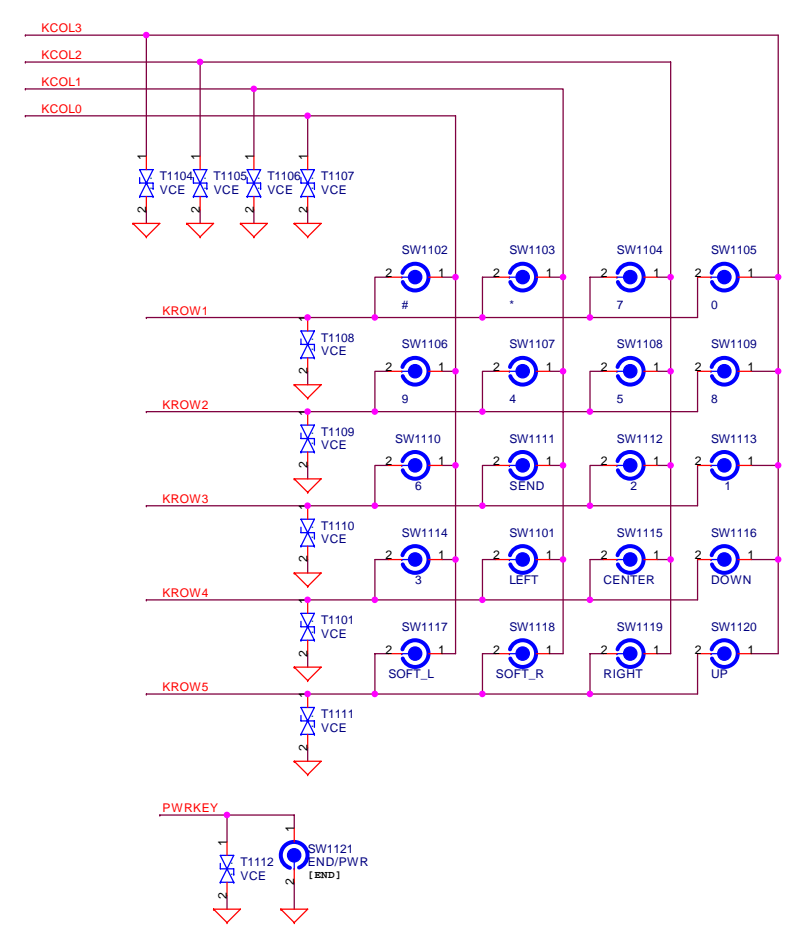
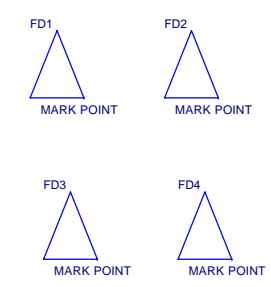
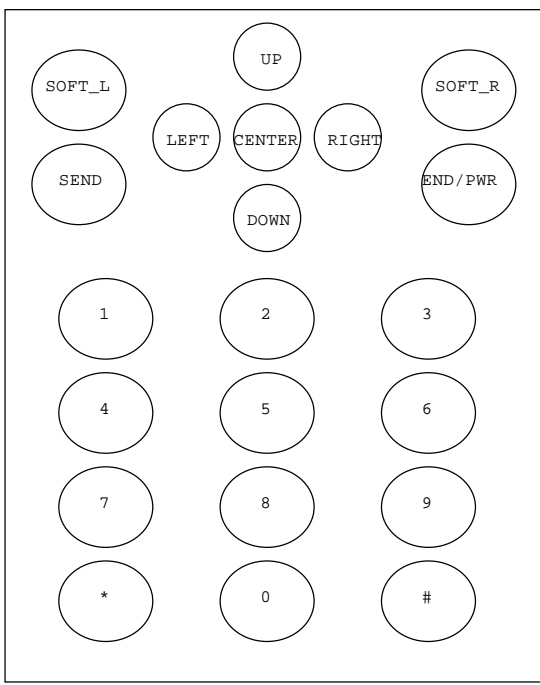
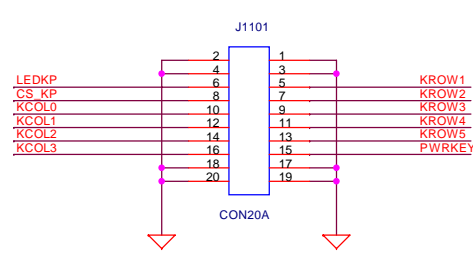
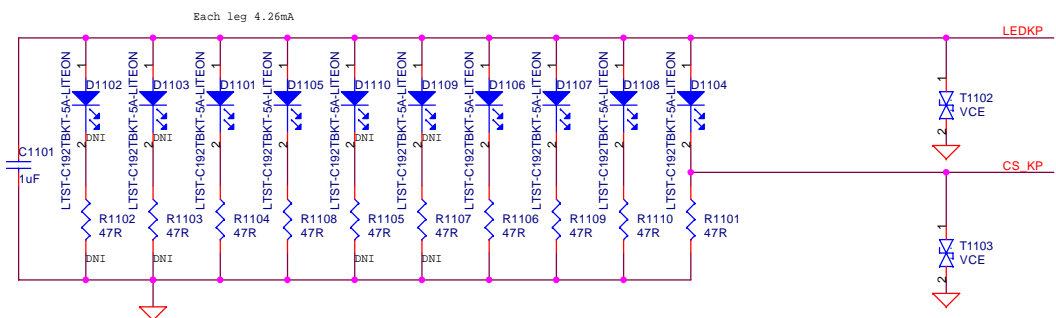


Title			LCD&CAMERA		
Size	A3	Document Number			
Date:	Wednesday, June 04, 2008	Sheet	7	of	12









321-0000-00142

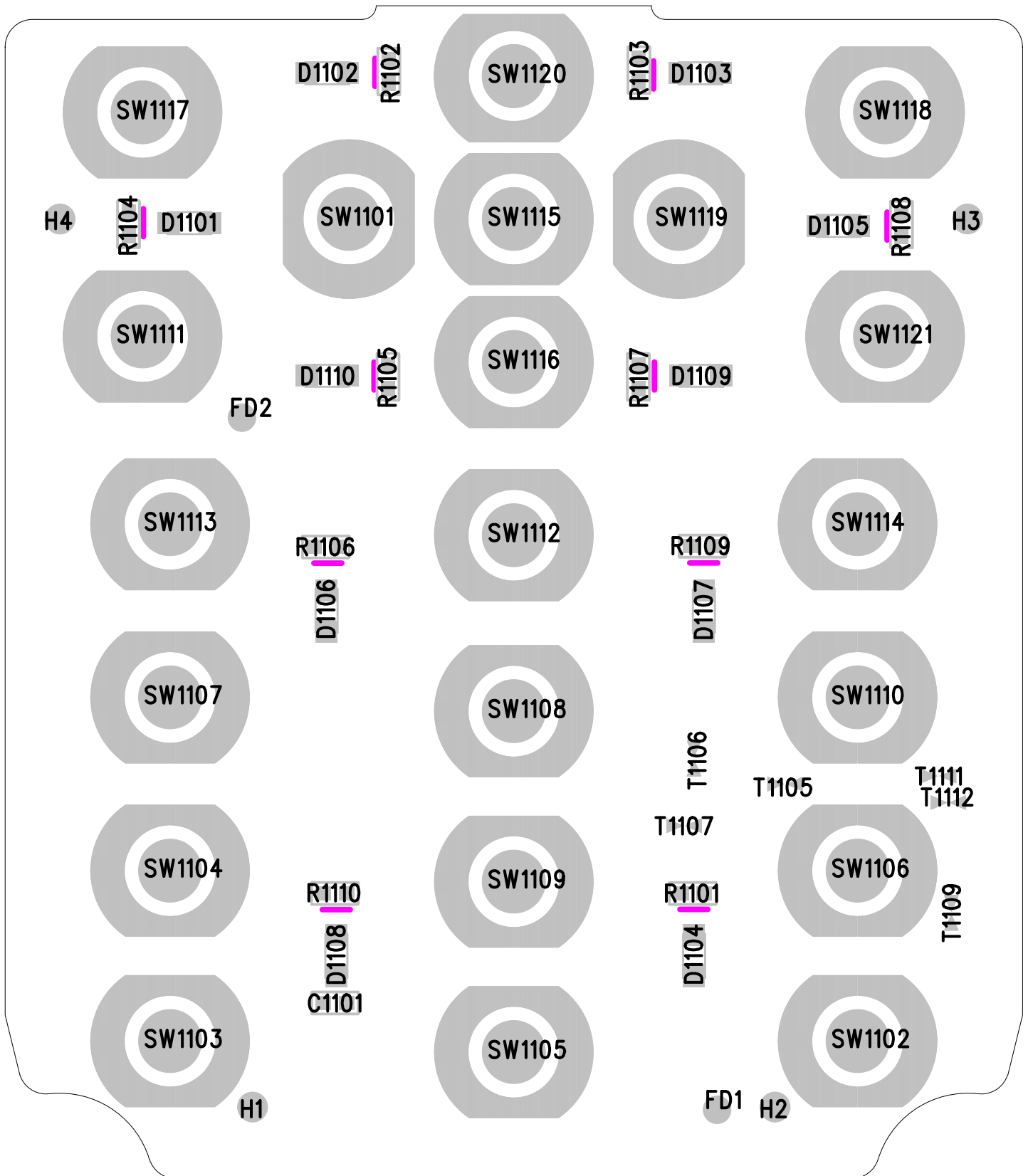
7339KB-003

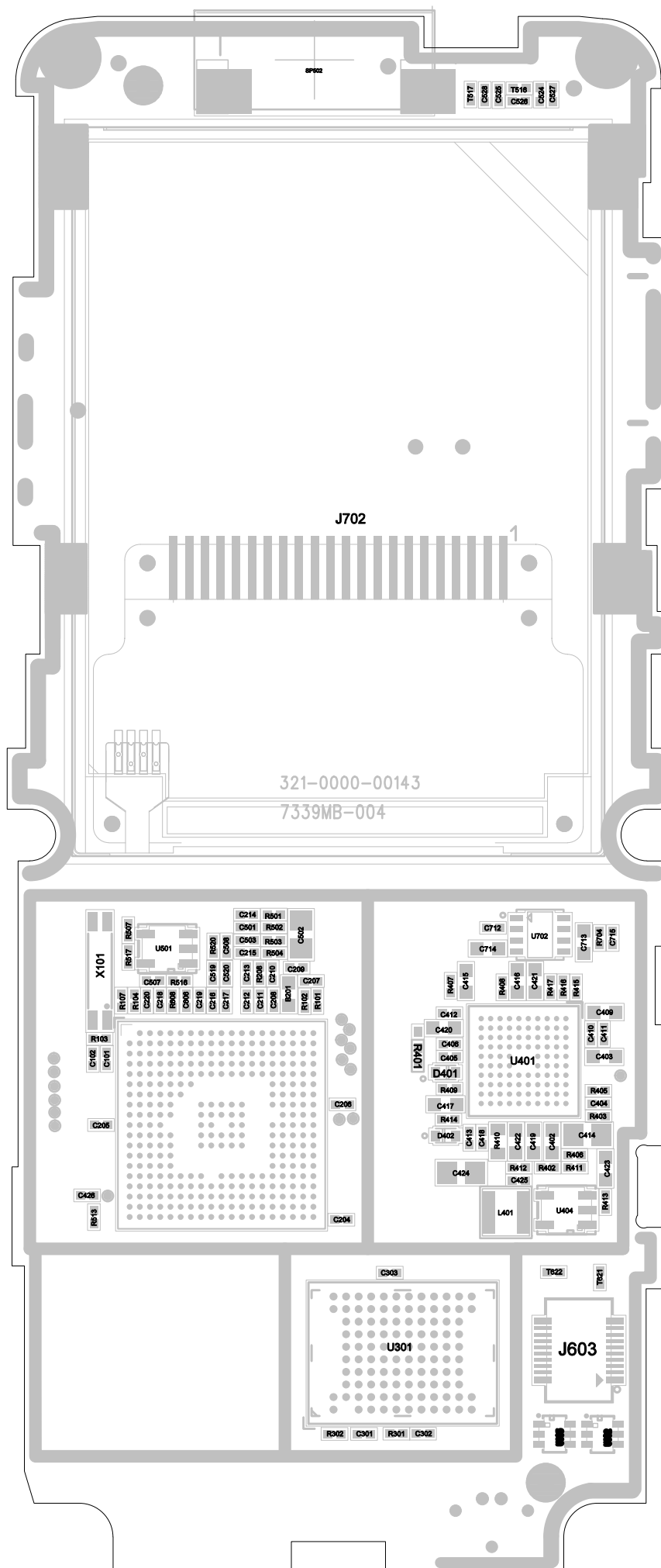
19

20

2

1







<<	Previous Section	
	Next Section	>>
	Main Menu	

6

SECTION 6

Servicing

- 6-1. Structure
- 6-2. Accessories
- 6-3. Exploded Diagram

1. KP199

Front View



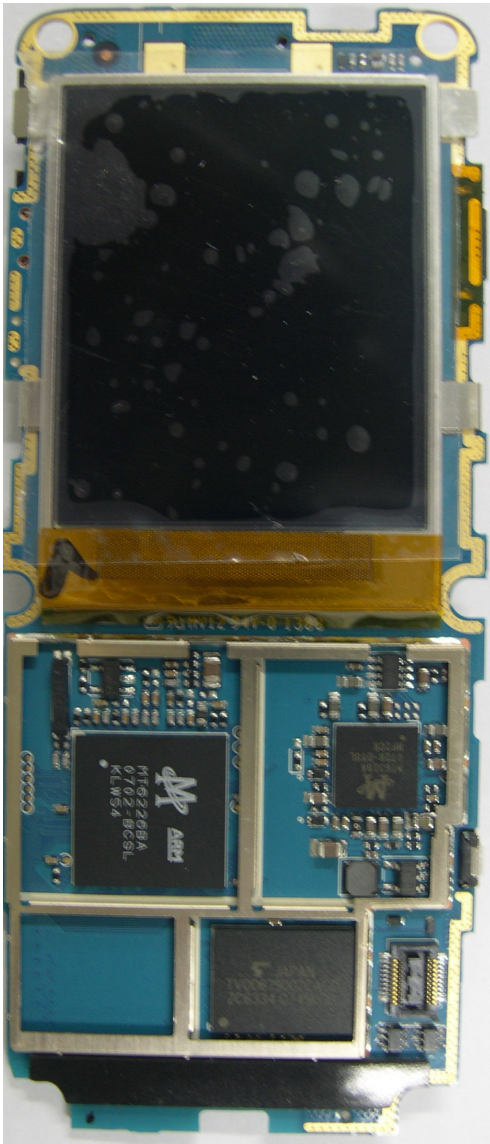
Back View



MAIN BOARD ASSEMBLY

The lower board consists of the following circuits:-

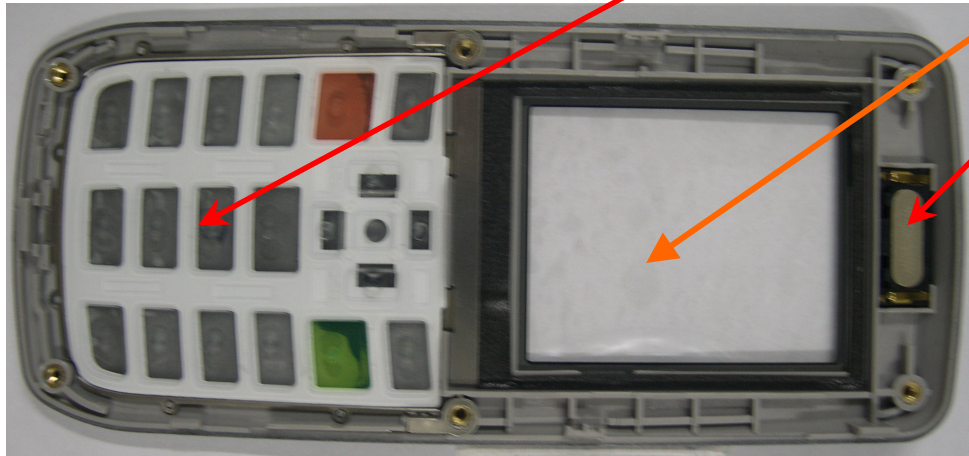
- 1.Tri band GPRS GSM Transceiver and logic Unit
- 2.SIM connection socket
- 3.System I/O connector with charge capability
- 4.battery terminals
- 5.Hands free jack
- 6.Embedded tri band antenna connection terminal
- 7.Vibrator connection terminal
- 8.Microphone connection terminal
- 9.Camera connection terminal
- 10.Receiver connection terminal
- 11.Speaker connection terminal
- 12.SD Card connection terminal
- 13.LED, camera control and LCD driver circuit



FRONT COVER

The Front cover contains following main parts :-

1. Receiver
2. Keypad
3. Main lens



2. keypad

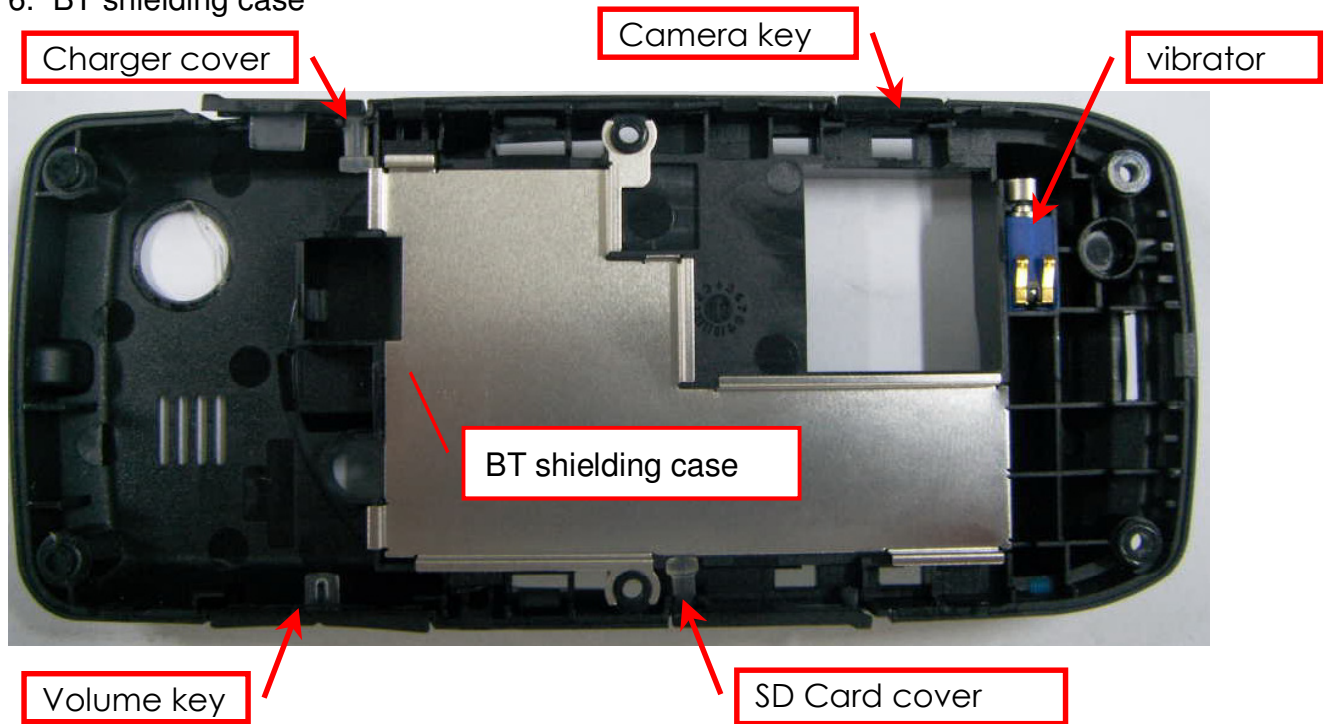
3. Main lens

1. Receive

REAR COVER

The Rear cover contains following main parts :-

1. Vibrator
2. Charger cover
3. SD card cover
4. Volume key
5. Camera key
6. BT shielding case



6-2. ACCESSORIES

BATTERY



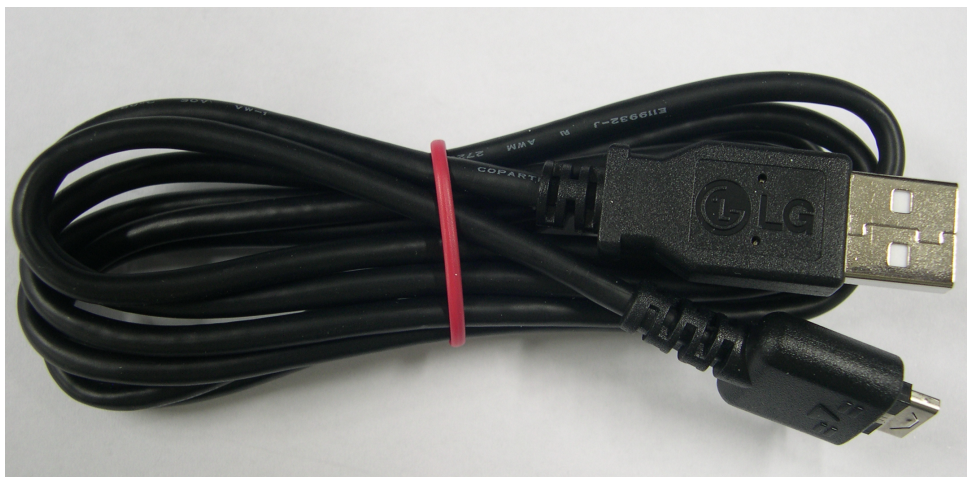
AC ADAPTER



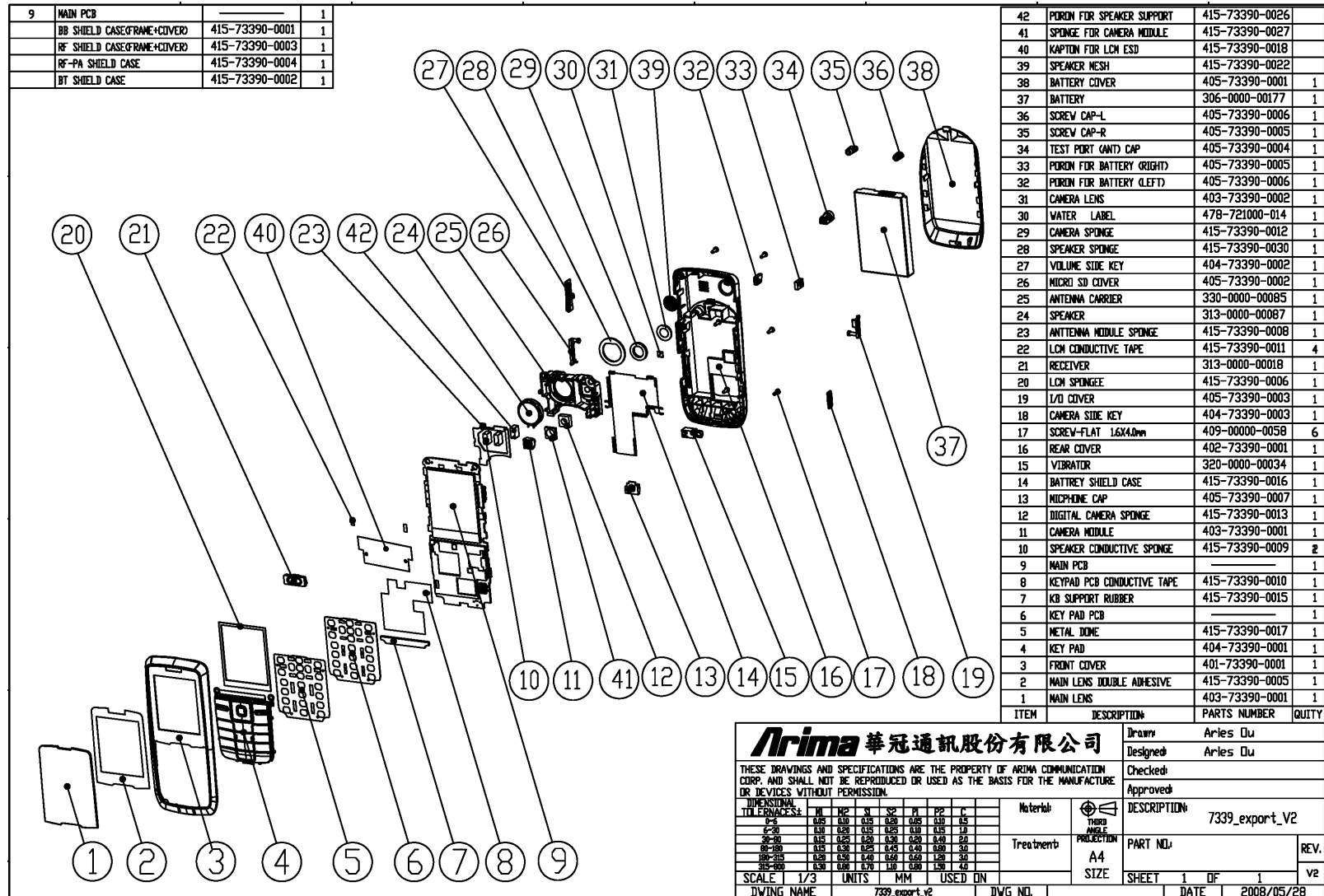
HANDSFREE & USB CABLE



Cable



6-3. EXPLODED DIAGRAM



Arima PN compare with LGE PN

Item	Description	Arima P/N	LG P/N
1	main lens	403-73390-0001	MWAC0103201
2	main lens double adhesive	415-73390-0005	LGE have not released PN to Arima
3	front cover	401-73390-0001	MCJK0091101
4	key pad	404-73390-0001	LGE have not released PN to Arima
5	metal dome	415-73390-0017	LGE have not released PN to Arima
6	key pad pcb	-----	-----
7	KB support rubber	415-73390-0015	LGE have not released PN to Arima
8	key pad pcb conductive tape	415-73390-0010	LGE have not released PN to Arima
9	main pcb	-----	-----
10	speaker conductive sponge	415-73390-0009	LGE have not released PN to Arima
11	camera module	403-73390-0001	MWAC0103201
12	digital camera sponge	415-73390-0013	LGE have not released PN to Arima
13	micphone cap	405-73390-0007	LGE have not released PN to Arima
14	battery shielding case	415-73390-0016	LGE have not released PN to Arima
15	vibrator	320-0000-00034	LGE have not released PN to Arima
16	rear cover	402-73390-0001	MKAG0010201
17	screw_falt 1.6*4.0mm	409-00000-0058	LGE have not released PN to Arima
18	camrea side key	404-73390-0003	MBJC0027501
19	I/O cover	405-73390-0003	LGE have not released PN to Arima
20	LCM sponge	415-73390-0006	LGE have not released PN to Arima
21	receiver	313-0000-00018	SURY0014201
22	LCM conductive tape	415-73390-0011	LGE have not released PN to Arima
23	antenna module sponge	415-73390-0008	LGE have not released PN to Arima
24	speaker	313-0000-00087	SUSY0028201
25	antenna carrier	330-0000-00085	LGE have not released PN to Arima
26	micro SD cover	405-73390-0002	LGE have not released PN to Arima
27	volume side key	404-73390-0002	MBJL0062701
28	speaker sponge	415-73390-0030	LGE have not released PN to Arima
29	camera sponge	415-73390-0012	LGE have not released PN to Arima
30	water label	478-721000-014	LGE have not released PN to Arima
31	camera lens	403-73390-0005	LGE have not released PN to Arima
32	poron for battery(left)	405-73390-0006	LGE have not released PN to Arima
33	poron for battery(right)	405-73390-0005	LGE have not released PN to Arima
34	test port (ant) cap	405-73390-0004	LGE have not released PN to Arima
35	screw cap_R	405-73390-0005	LGE have not released PN to Arima
36	screw cap_L	405-73390-0006	LGE have not released PN to Arima
37	battery	306-0000-00177	LGE have not released PN to Arima
38	battery cover	405-73390-0001	MCJA0068501
39	speaker mesh	415-73390-022	LGE have not released PN to Arima
40	kapton for LEM_ESD	415-73390-0018	LGE have not released PN to Arima
41	sponge for camera module	415-73390-0027	LGE have not released PN to Arima
42	poron for speaker module	415-73390-0026	LGE have not released PN to Arima

<<	Previous Section	
	Next Section	>>
	Main Menu	

Section 7

Repairing

7-1. Testing

7-2. Troubleshooting

7-3 RF calibration/test tool

7-4 SW download tool

7-5 Spare parts list

7-1. TESTING

OVERVIEW

1. Product overview and frequency assignment

Radio Frequency Band	TX E-GSM	880MHz to 915MHz (deltaF=200KHz)
	RX E-GSM	925MHz to 960MHz (deltaF=200KHz)
	TX DCS1800	1710MHz to 1785MHz
	RX DCS1800	1805MHz to 1880MHz
	TX PCS1900	1850MHz to 1910MHz
	RX PCS1900	1930MHz to 1990MHz
ARFCN	E-GSM	Ful(n) = $890 + 0.2 \times n$ at ($0 \leq n \leq 124$)
		Ful(n) = $880 + 0.2 \times (n-1024)$ at ($975 \leq n \leq 1023$)
		Fdl(n) = Ful(n) + 45
	DCS1800	Ful(n) = $1710.2 + 0.2 \times (n-512)$ at ($512 \leq n \leq 885$)
		Fdl(n) = Ful(n) + 95
	PCS1900	Ful(n) = $1850.2 + 0.2 \times (n-512)$ at ($512 \leq n \leq 810$)
RF Local Synthesizer		Fdl(n) = Ful(n) + 80
	E-GSM	1279~1314 MHz
	DCS1800	1327~1402 MHz
TX IF Frequency	PCS1900	1423~1483 MHz
	E-GSM	798 MHz (Typ) (880-895 MHz, 900-915 MHz)
		790 MHz (Typ) (895-900 MHz)
	DCS1800	766 MHz (Typ)
	PCS1900	854 MHz (Typ)
Access form		8 channel multiple TDMA
Multiple		8 channel / carrier (E-GSM/DCS1800/PCS1900)
Modulation		270.8333Kbit/s GMSK
Peak output power	E-GSM	2W(33dBm) Class4 MTS
	DCS1800	1W(30dBm) Class1 MTS
	PCS1900	1W(30dBm) Class1 MTS
Nominal supply voltage		+3.8V
TX peak current		2500mA max.
GPRS Class		Class10 (max 1UL/4DL) Operation class B
GPRS Coding scheme		CS1/CS2/CS3/CS4

2. Channel selection conditions

Verify that there is no interference from other radio devices or neighboring measurement systems in the frequencies to be used for the test. If there is interference, select the test channels within the range of the following channels. Especially in case of bit error tests, make sure that there is no influence from outside before the test. If necessary, use a shielded box or take other channel measures.

	E-GSM	DCS1800	PCS1900
L ch	975ch to 980ch	513ch to 523ch	512ch to 522ch
Mch	60ch to 65ch	690ch to 710ch	657ch to 667ch
Hch	120ch to 124ch	874ch to 884ch	800ch to 810ch

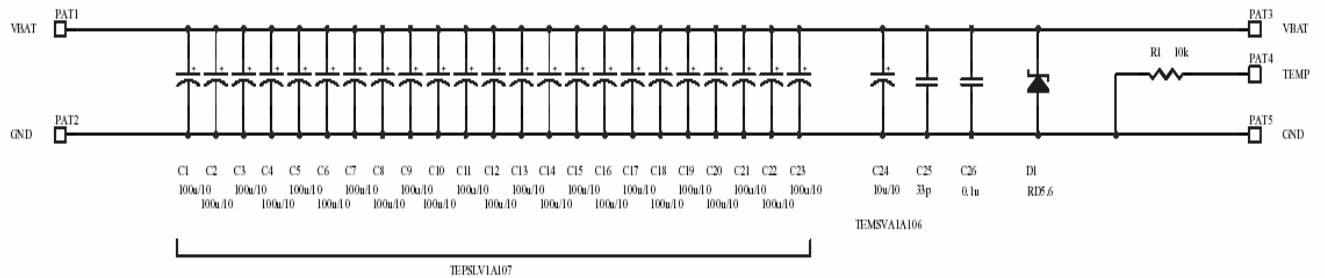
3. Product Specification

Based on GSM 11.10-1 / 3G TS 51.110

4. Measurement adapter

Dummy battery

Dummy battery should be used shown as follows:



Test SIM card

In confidence test, general Phase2 (or Phase2+) test SIM should be used.

RF connector and RF cable

RF connector and RF cable should be used for RF test

PC-Link cable

PC-link cable (Serial Link Cable) should be used.

FUNCTION TEST

1. Test purpose

- a) To verify Appearance by visual check
- b) To verify recognition of SIM card
- c) To verify Function Test in the table shown as below
- d) To verify power down phone

2. Test System

- 1. Power Supply Unit (PSU)+Dummy Battery or Battery
- 2. Test SIM Card (Spec: GSM Phase 2+ Test SIM Standard 1(3.1))
- 3. Sample Hands free Kit (SHF, Stereo)

3. Test Procedure

3.1 Appearance Test

Verify appearance by visual check

3.2 SIM Test

Verify recognition of SIM card

If "Insert SIM" indicated on Display, it is NG.

3.3 Enter Service Mode

3.1.1 No SIM Card installed

- a. Power on Phone
- b. Press **878** to enter service mode.

3.1.2 SIM Card installed

- a. Power on Phone
- b. Press ***#878#** to enter service mode.

3.1.3 Software Version Check

Select item 1 "Service Info" in Service mode to check software version.

3.4 MMI Tests

1. Auto test
2. BT Mode
3. Echo Loop
4. Version
5. Resource BIN
6. Keypad
7. Vibrator
8. Loud SPK
9. Ring Tone
10. LED
11. LCD
12. Receiver
13. ADC
14. Charger
15. Headset
16. RTC
17. MTBF
18. UART
19. Memory Card
20. Nand Flash
21. Camera
22. Total call time
23. FM Radio

CONFIDENCE TEST

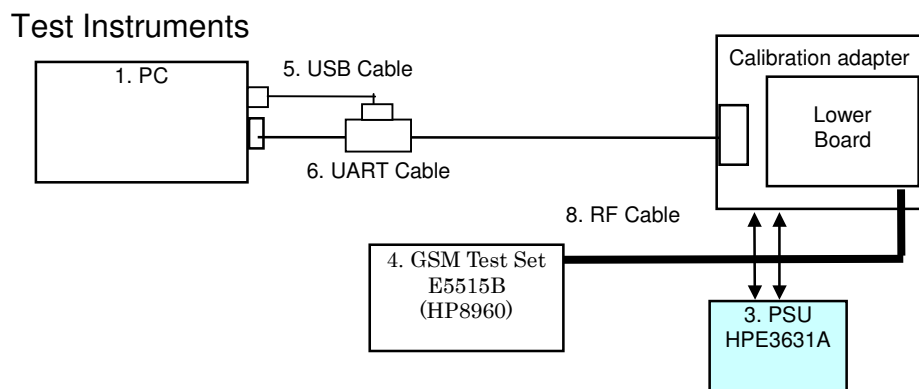
1. Test purpose

This test is for check RF characteristics.

2. Test system

1. PC
2. Printer
3. PSU
4. GSM Test Set
5. USB Cable
6. UART Cable
7. Calibration Adapter
8. RF Cable

Measurement setup is shown as follows:

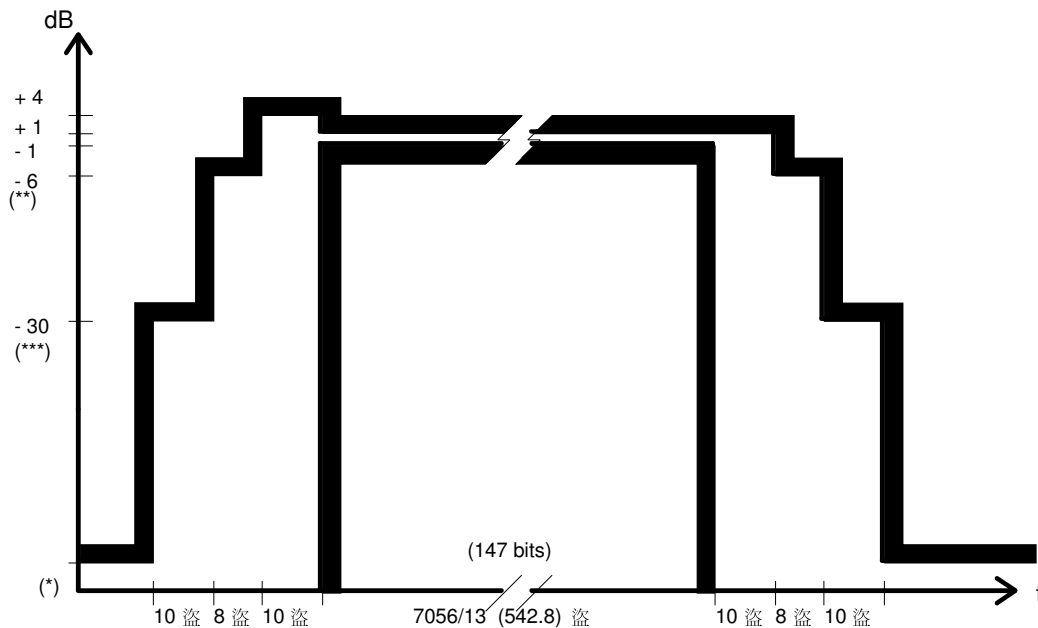


3. Test Specification

Measurement item and specification is defined as follows:

Test Item	Specification		
	E-GSM	DCS1800	PCS1900
TX Maximum Power	33dBm +/-2dB	30dBm +/-2dB	
TX Power	31dBm +/- 3dB @ PL6 29dBm +/- 3dB @ PL7 27dBm +/- 3dB @ PL8 25dBm +/- 3dB @ PL9 23dBm +/- 3dB @ PL10 21dBm +/- 3dB @ PL11 19dBm +/- 3dB @ PL12 17dBm +/- 3dB @ PL13 15dBm +/- 3dB @ PL14 13dBm +/- 3dB @ PL15 11dBm +/- 5dB @ PL16 9dBm +/- 5dB @ PL17 7dBm +/- 5dB @ PL18 5dBm +/- 5dB @ PL19	28dBm +/- 3dB @ PL1 26dBm +/- 3dB @ PL2 24dBm +/- 3dB @ PL3 22dBm +/- 3dB @ PL4 20dBm +/- 3dB @ PL5 18dBm +/- 3dB @ PL6 16dBm +/- 3dB @ PL7 14dBm +/- 3dB @ PL8 12dBm +/- 4dB @ PL9 10dBm +/- 4dB @ PL10 8dBm +/- 4dB @ PL11 6dBm +/- 4dB @ PL12 4dBm +/- 4dB @ PL13 2dBm +/- 5dB @ PL14 0dBm +/- 5dB @ PL15	
RMS Phase error	<5deg		
PEAK Phase error	<20deg		
Frequency Error	< 90Hz	< 180Hz	< 185Hz
Power Vs Time	pass/fail indication. Detail specification is shown as table 4.1		
RX Class2 RBER	<2.4% @ -103.5dBm (avg 10000bit)		
RX Level	7 +/-4 @ -103.5dBm		
RX Quality	<3 @ -103.5dBm		

Power Vs Time mask specification



Time mask for normal duration bursts(NB,FB,dB and SB) at GMSK modulation

- (*) For GSM 900 MS : -59 dBc or -54 dBm, whichever is the greater, except for the time slot preceding the active slot, for which the allowed level is -59 dBc or -36 dBm whichever is the greater
- For DCS1800 and PCS1900 MS : -48 dBc or -48 dBm, whichever is the higher.
- (**) For GSM 900 MS : -4 dBc for power control level 16;
-2 dBc for power level 17;
-1 dBc for power level controls levels 18 and 19.
- For DCS1800 and PCS1900 MS : -4dBc for power control level 11,
-2dBc for power level 12,
-1dBc for power control levels 13,14 and 15
- (***) For GSM 900 MS : -30 dBc or -17 dBm, whichever is the higher.
- For DCS1800 and PCS1900 MS : -30dBc or -20dBm, whichever is the higher.

4. Test Procedure

Test items should be sequential in the table shown as below. Due to limitation of GSM test set, the test should be started under E-GSM mode and hand over to DCS1800. In PCS1900 mode, the test should be started under PCS1900 mode.

Default setting of GSM test set and PSU is shown as follows:

(Internal Loss)	(Please measure cable loss on first set-up and calibrate it.)
CALL STATUS	IDLE
CELL STATUS	ACTIVE CELL
OPERATING MODE	E-GSM
Expected input level	TX Level 5 : 33dBm
Control Base station Broadcast	Broadcast ON
Control Base station Channel	20
Control Base station Amplitude	-85dBm
Mobile Phone Channel	62 (could be changed ARFCN Mch)
Mobile Phone TX Level	5
Mobile Phone Timeslot	4
PSU output voltage	+3.8V +/- 0.05V
PSU maximum current limit	2500mA

CALL STATUS	IDLE
CELL STATUS	ACTIVE CELL
OPERATING MODE	PCS1900
Expected input level	TX Level 0 : 30dBm
Control Base station Broadcast	Broadcast ON
Control Base station Channel	512
Control Base station Amplitude	-85dBm
Mobile Phone Channel	661 (could be changed ARFCN Mch)
Mobile Phone TX Level	0
Mobile Phone Timeslot	4
PSU output voltage	+3.8V +/- 0.05V
PSU maximum current limit	2800mA

Test item	MODE	Procedure
Start up	E-GSM	1. Set SIM card and dummy battery to HHP 2. Power on HHP 3. Wait to indicate "GSM Test Net 001"
Call setup	E-GSM	1. Input the PTE command "StartCall" 2. Input the PTE command "ReceiveCall". 3. Wait to indicate "Active" to establish call
TX Power	E-GSM DCS1800	1. ARFCN is assign to Mch (and Lch/Hch) 2. Set PL to 5(E-GSM) or 0(DCS1800) 3. Wait to establish hand over 4. Measure output power
RMS Phase error	E-GSM DCS1800	1. ARFCN is assigned to Mch (or Lch/Hch) 2. Set PL to 5(E-GSM) or 0(DCS1800) 3. Wait to establish hand over 4. Change mode of GSM tester to "Phase/FREQ" 5. Set analyze burst number to 50 6. Read "RMS maximum" window
PEAK Phase error	E-GSM DCS1800	1. ARFCN is assigned to Mch (or Lch/Hch) 2. Set PL to 5(E-GSM) or 0(DCS1800) 3. Wait to establish hand over 4. Change mode of GSM tester to "Phase/FREQ" 5. Set analyze burst number to 50 6. Read "PEAK maximum" window
Frequency Error	E-GSM DCS1800	1. ARFCN is assigned to Mch (or Lch/Hch) 2. Set PL to 5(E-GSM) or 0(DCS1800) 3. Wait to establish hand over 4. Change mode of GSM tester to "Phase/FREQ" 5. Set analyze burst number to 50 6. Read "Frequency error maximum" window
Power Vs Time	E-GSM DCS1800	1. ARFCN is assigned to Mch 2. Set PL to 5(E-GSM) or 0(DCS1800) 3. Wait to establish hand over 4. Change mode of GSM tester to "Power Ramp" 5. To check pass/fail indication under three mode "TOP 2dB" "Rise edge" and "Fall edge"
RX Class2 RBER	E-GSM DCS1800	1. ARFCN is assigned to Mch*1 2. Set PL to 5(E-GSM) or 0(DCS1800) 3. Wait to establish hand over 4. Change mode of GSM tester to "Bit error" 5. To define sampling value to 10000 6. To define measure "Res Type 2" 7. To adjust base station output level to -103.5dBm 8. Wait to indicate BE Ratio and read it.
RX Level	E-GSM DCS1800	1. Same setting and procedure as RX RBER 2. Wait to indicate "Mobile reported Rxlev" and read it.
RX Quality	E-GSM DCS1800	1. Same setting and procedure as RX RBER 2. Wait to indicate "Mobile reported RX Qual" and read it.
Hand over	E-GSM to DCS1800	1. Change mode of GSM tester to "DUAL BAND" 2. To define DCS1800 parameter. ARFCN to Mch, Base station output level to -85dBm, Mobile power level to PL0. 3. Push "Execute" and check establish hand over.
		(Test is repeated under DCS1800 band)
Close down	DCS1800	1. Push "END Call" of GSM tester 2. Wait to indicate "Call End" and change to idle screen. 3. Push "Power" to check shut down.

*1 Refer to 1.Overview Channel selection condition

Test item	MODE	Procedure
Band Change	E-GSM / DCS1800 -> PCS1900	1. Change mode of GSM tester to "PCS1900". 2. Set HHP to PCS1900 mode using PTE Command Use PTE command 00140 => SetBandSelect,1
Call setup	PCS1900	1. Input the PTE command "Start Call" 2. input the PTE command "Receive call" 3. Wait to indicate "Active" to establish call
TX Power	PCS1900	1. ARFCN is assign to Mch (or Lch/Hch) 2. Set PL to 0(PCS1900) 3. Wait to establish hand over 4. Measure output power
RMS Phase error	PCS1900	1. ARFCN is assigned to Mch (or Lch/Hch) 2. Set PL to 0(PCS1900) 3. Wait to establish hand over 4. Change mode of GSM tester to "Phase/FREQ" 5. Set analyze burst number to 50 6. Read "RMS maximum" window
PEAK Phase error	PCS1900	1. ARFCN is assigned to Mch (or Lch/Hch) 2. Set PL to 0(PCS1900) 3. Wait to establish hand over 4. Change mode of GSM tester to "Phase/FREQ" 5. Set analyze burst number to 50 6. Read "PEAK maximum" window
Frequency Error	PCS1900	1. ARFCN is assigned to Mch (or Lch/Hch) 2. Set PL to 0(PCS1900) 3. Wait to establish hand over 4. Change mode of GSM tester to "Phase/FREQ" 5. Set analyze burst number to 50 6. Read "Frequency error maximum" window
Power Vs Time	PCS1900	1. ARFCN is assigned to Mch 2. Set PL to 0(PCS1900) 3. Wait to establish hand over 4. Change mode of GSM tester to "Power Ramp" 5. To check pass/fail indication under three mode "TOP 2dB" "Rise edge" and "Fall edge"
RX Class2 RBER	PCS1900	1. ARFCN is assigned to Mch*1 2. Set PL to 0(PCS1900) 3. Wait to establish hand over 4. Change mode of GSM tester to "Bit error" 5. To define sampling value to 10000 6. To define measure "Res Type 2" 7. To adjust base station output level to -103.5dBm 8. Wait to indicate BE Ratio and read it.
RX Level	PCS1900	1. Same setting and procedure as RX RBER 2. Wait to indicate "Mobile reported Rx lev" and read it.
RX Quality	PCS1900	1. Same setting and procedure as RX RBER 2. Wait to indicate "Mobile reported RX Qual" and read it.
Close down	PCS1900	1. Push "END Call" of GSM tester 2. Wait to indicate "Call End" and change to idle screen. 3. Push "Power" to check shut down.

*1 Refer to 1.Overview Channel selection condition

3. Test Specification

Measurement item and specification is shown as below :

Test item	MODE	Specification
TX Maximum Power	E-GSM	+24dBm ~ +43dBm

Test item	MODE	Specification
Current Value		Max 100mA
USB I/F Check		Detection of HHP COM port

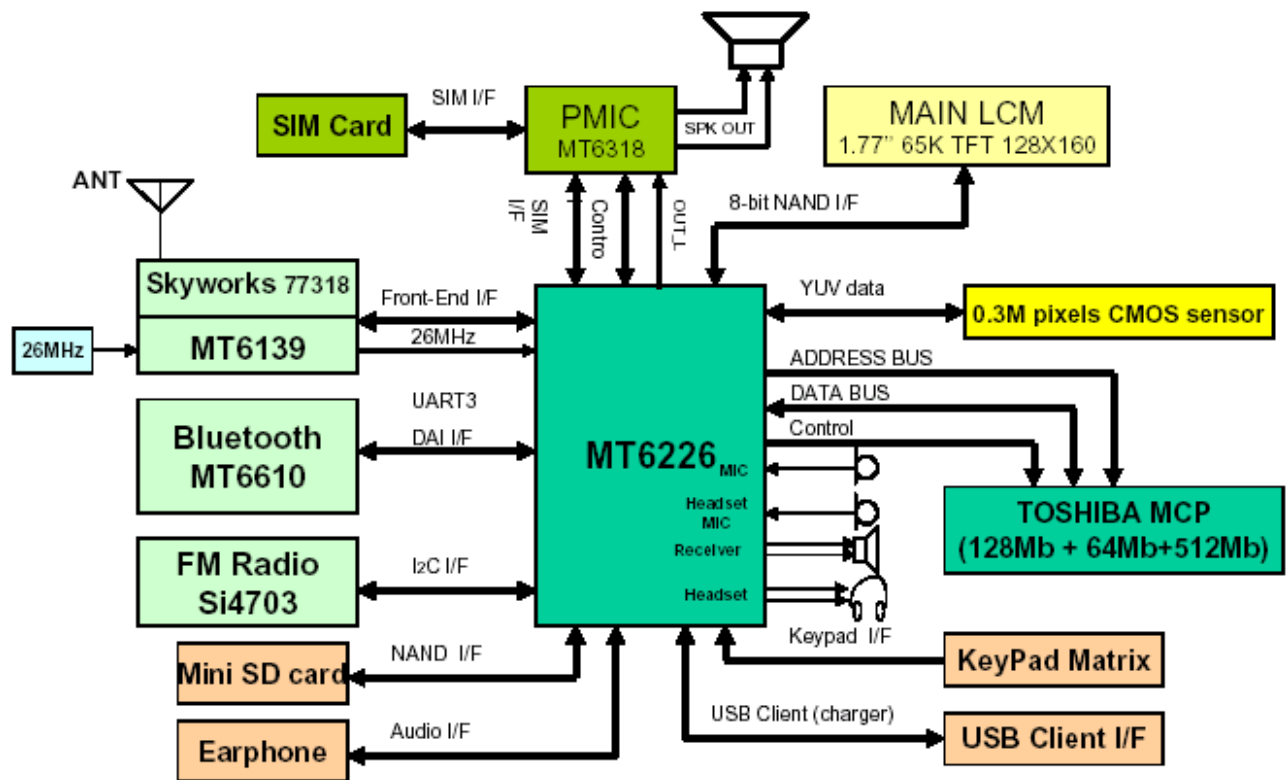
4. Test Procedure

Test items should be sequential in the table shown as below :

Test item	MODE	Procedure
Start up	E-GSM	1. Set dummy battery to HHP 2. Link cable is connected (auto power ON) 3. Put Into test mode
TX Power	E-GSM	1. ARFCN is assign to Mch 2. Set PL to 5(E-GSM) 3. Measure output power
Current Check		1. Input following PTE command. Use PTE Command, <Magic Number> Cont Tx off Backlight off Key Backlight off Select Backlight off 2. Check current value
USB I/F Check		1. Check detection of HHP COM port ^{*1}

7-2. TROUBLE SHOOTING

7-2-1 KP199 BB Trouble Shooting



PCBA Main BB ICs – Top Side

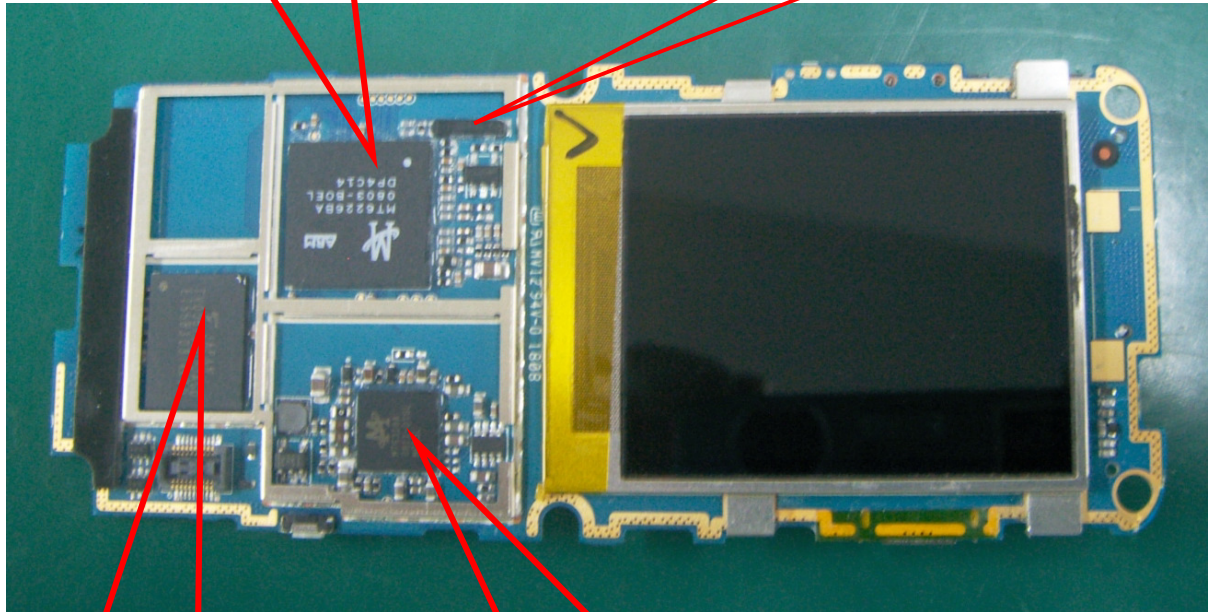
U101

Baseband Processor

(MT6226)

X101

32.768K Crystal



U301

Toshiba MCP
NOR+pSRAM+NAND
128M+64M+512M

U401

Power Management
(MT6318)

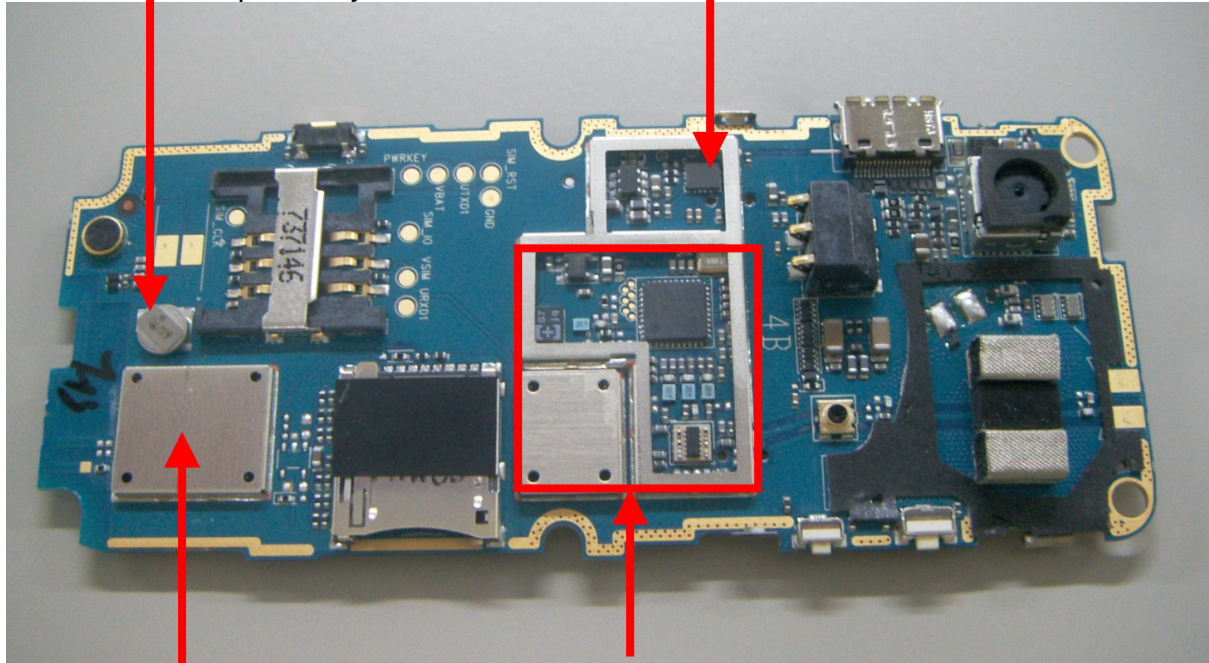
PCBA Main BB ICs – Bottom Side

BAT401

RTC Backup Battery

U801

FM IC



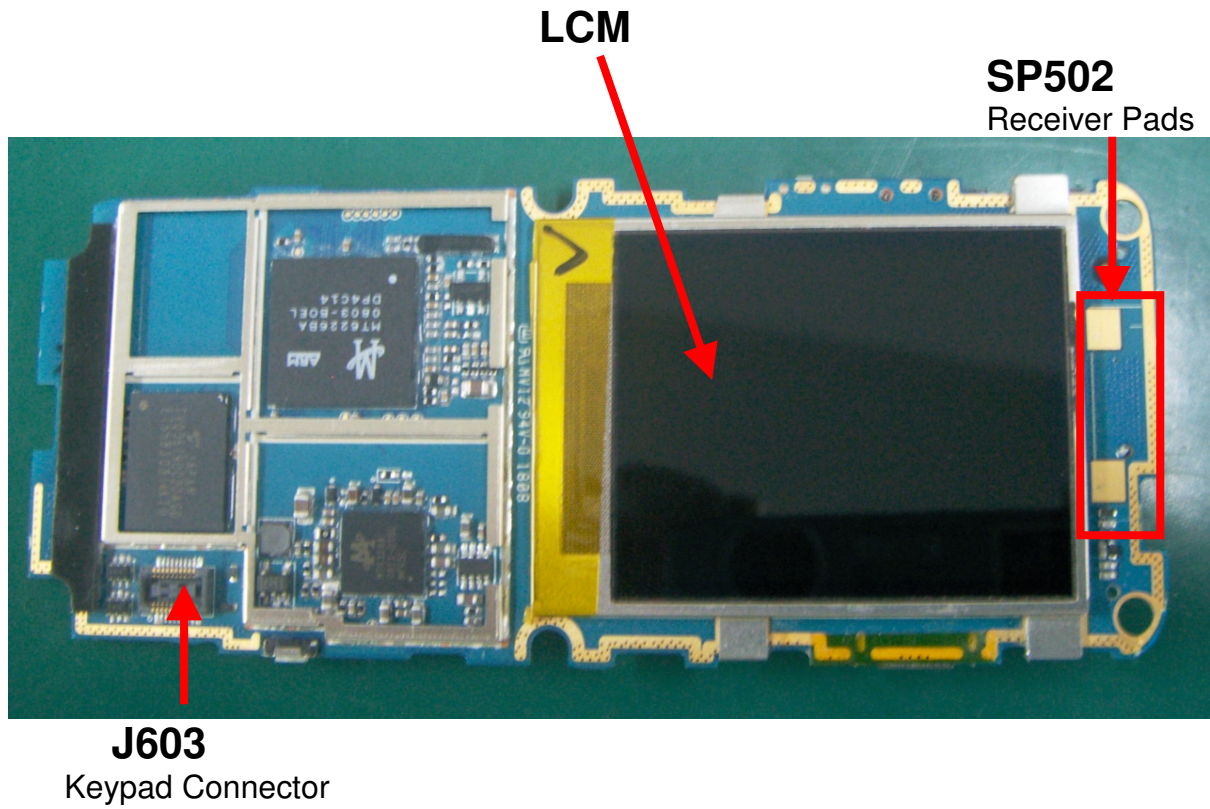
U901

Bluetooth IC
(MT6601)

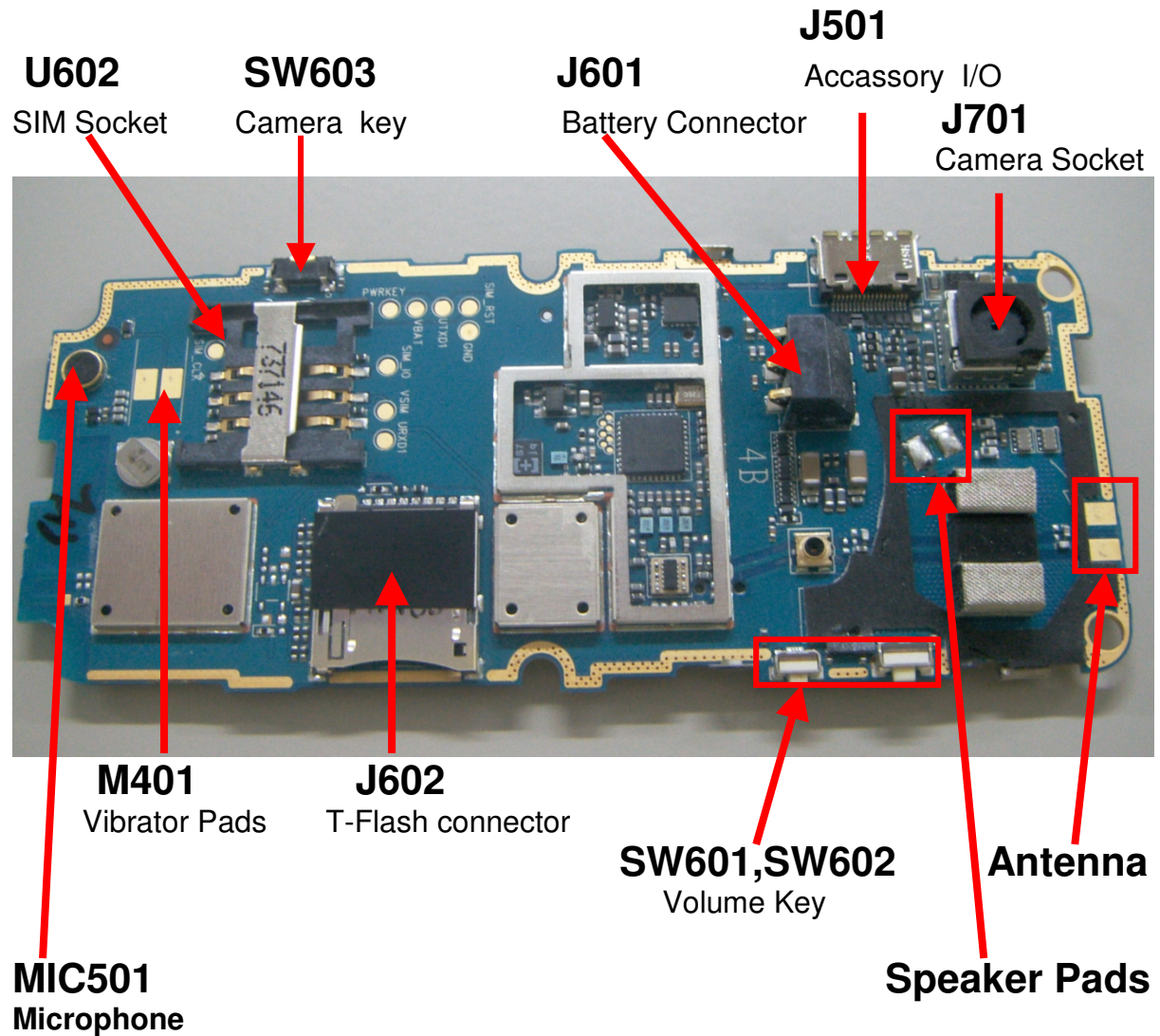
U1005+U1002

RF Block
(MT6139+SKY77318)

PCBA Main Connectors – Top Side

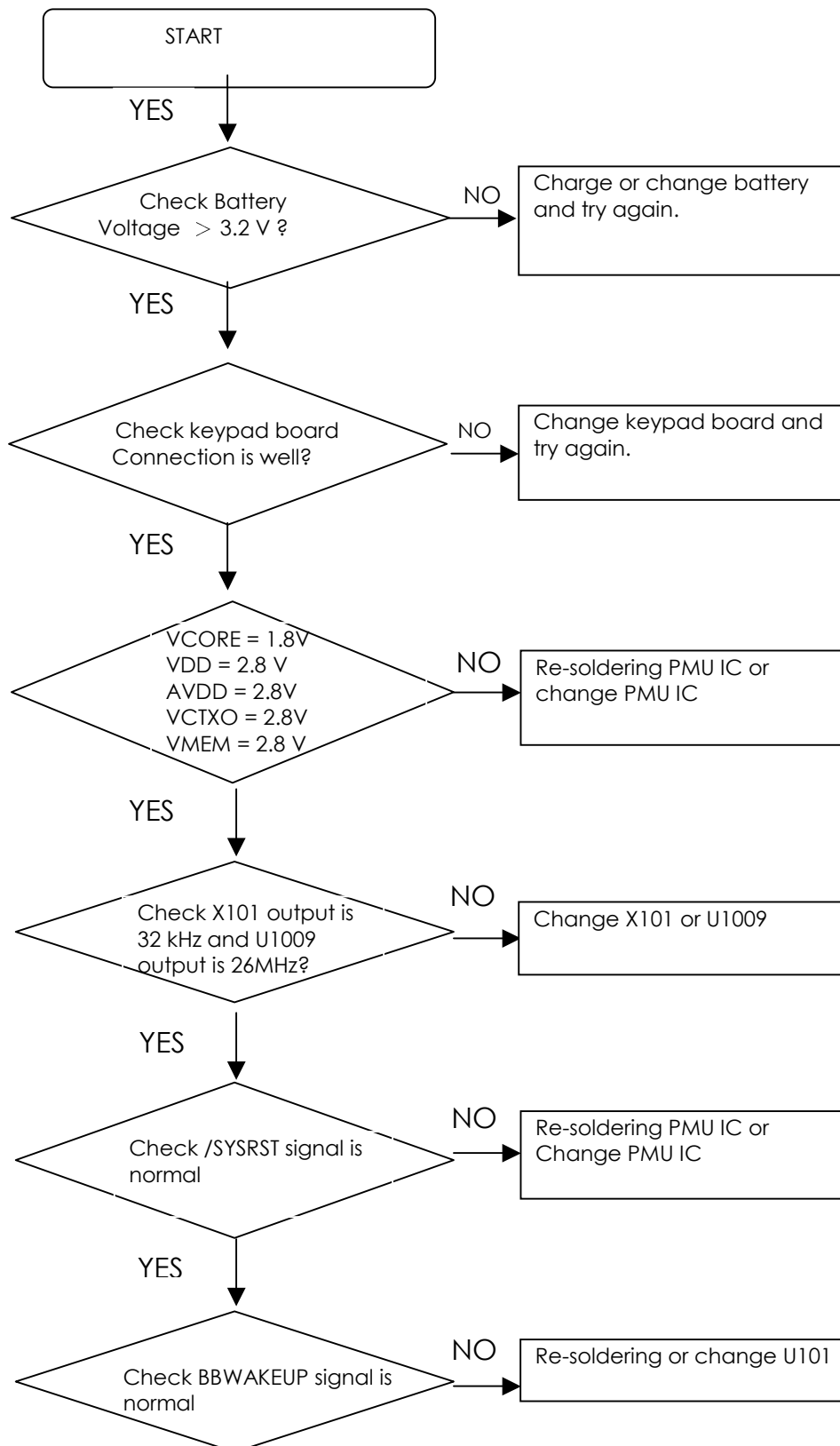


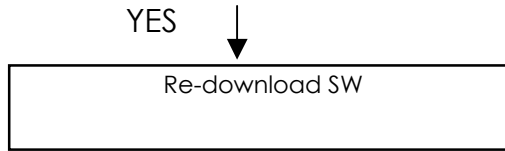
PCBA Main Connectors – Bottom Side



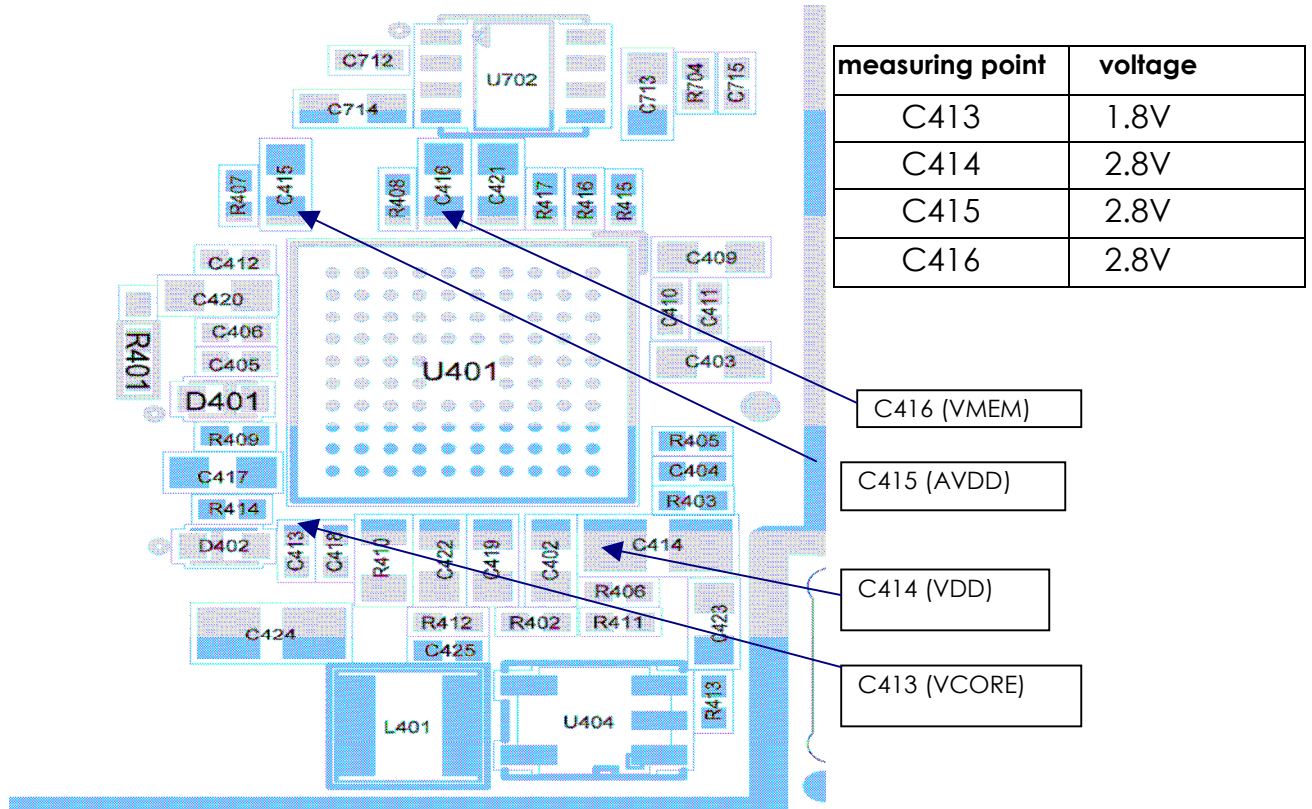
Can not power on

Analysis flow chart

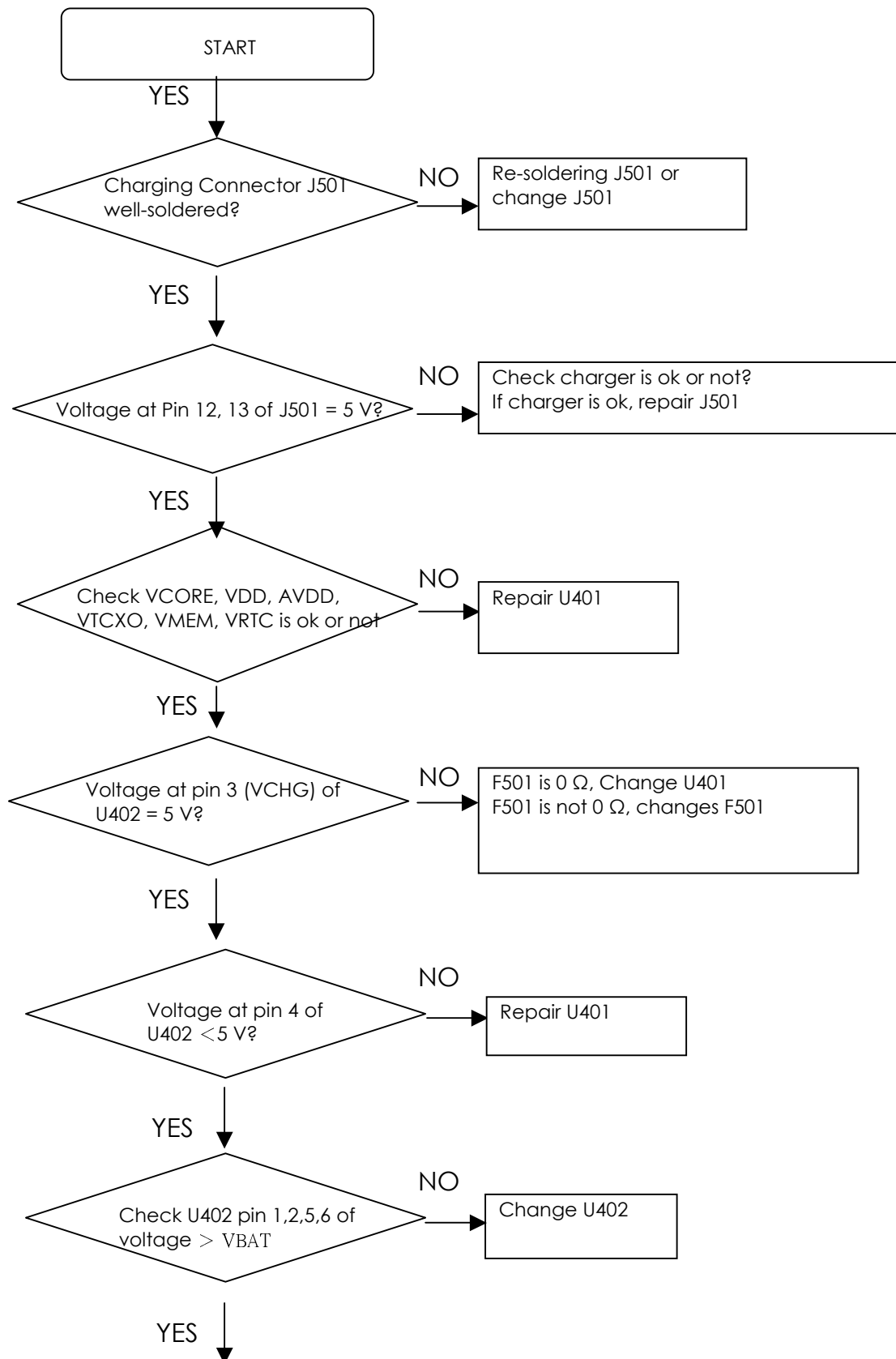


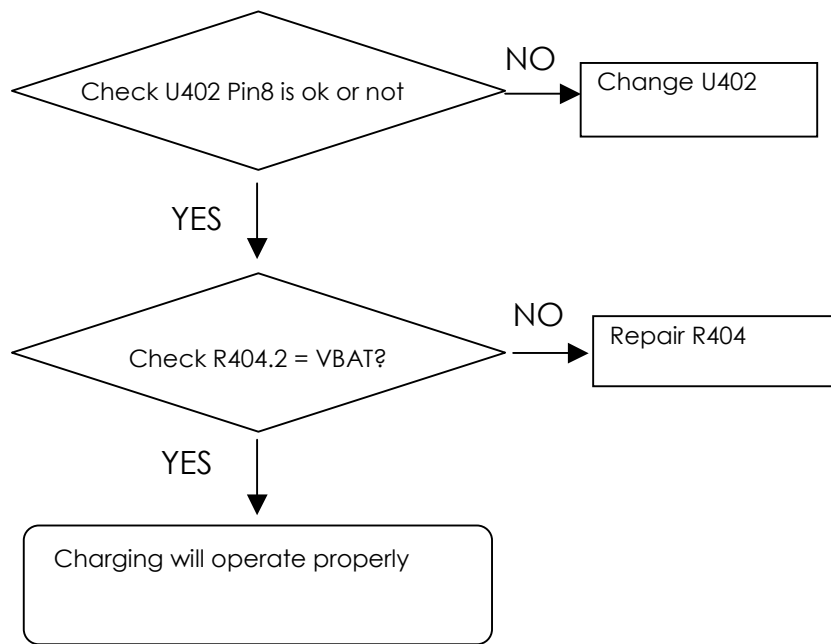


About measuring point of some power, please see below (Top Side).

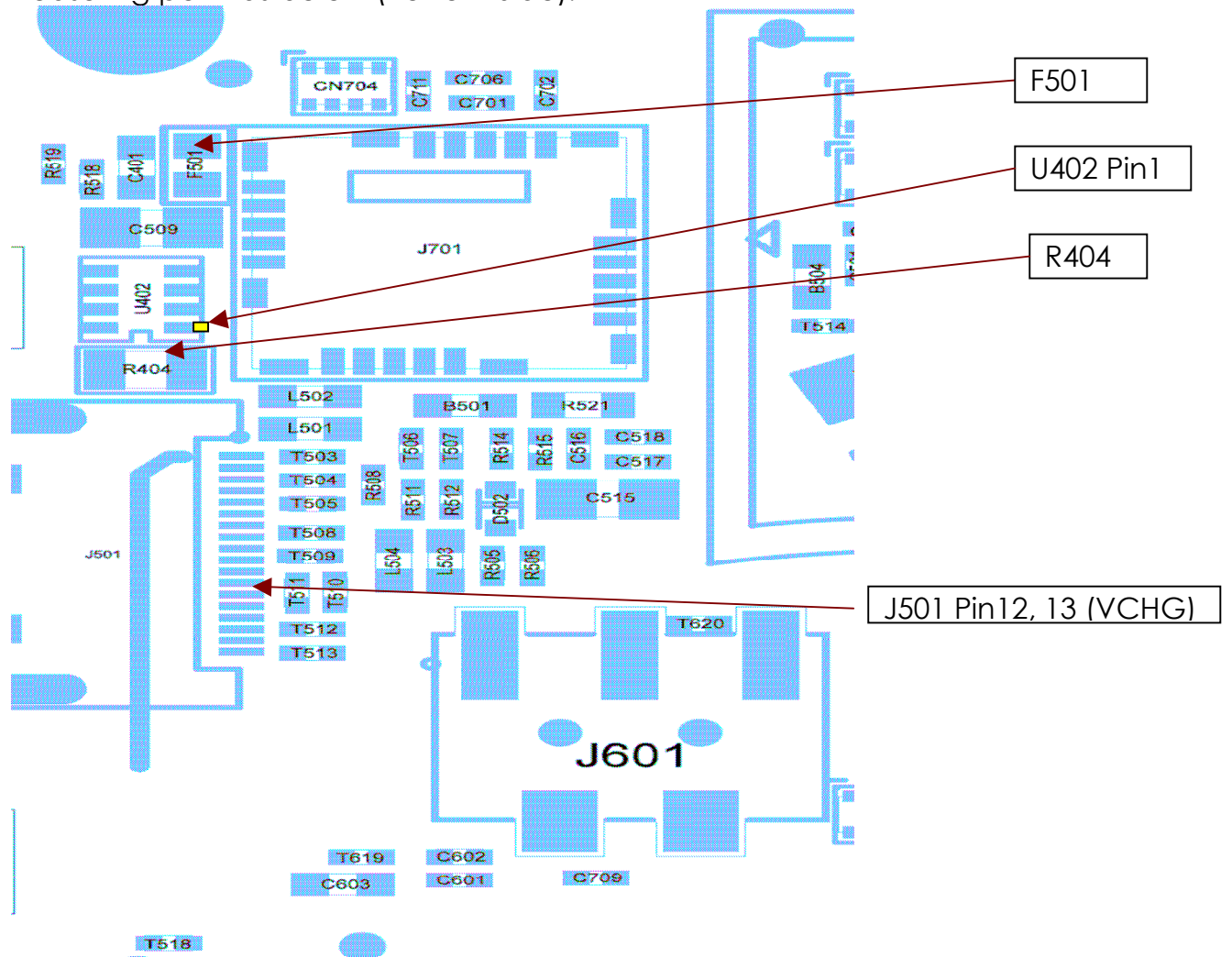


Can not charge battery

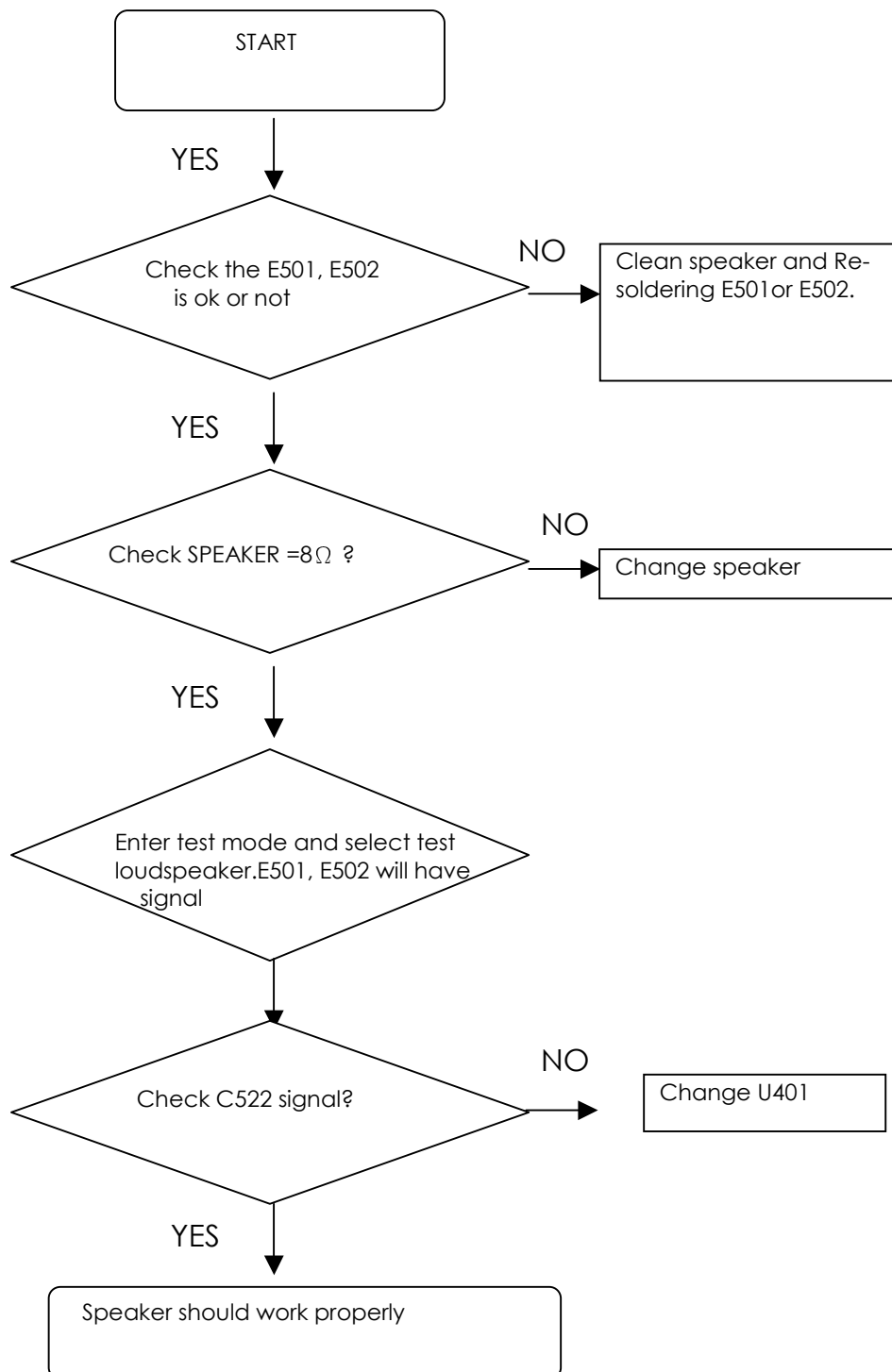




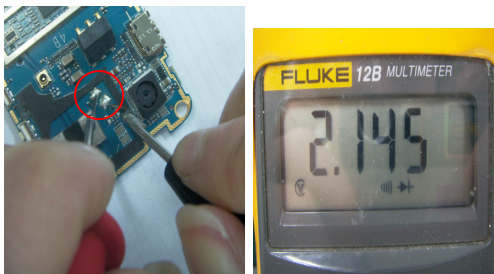
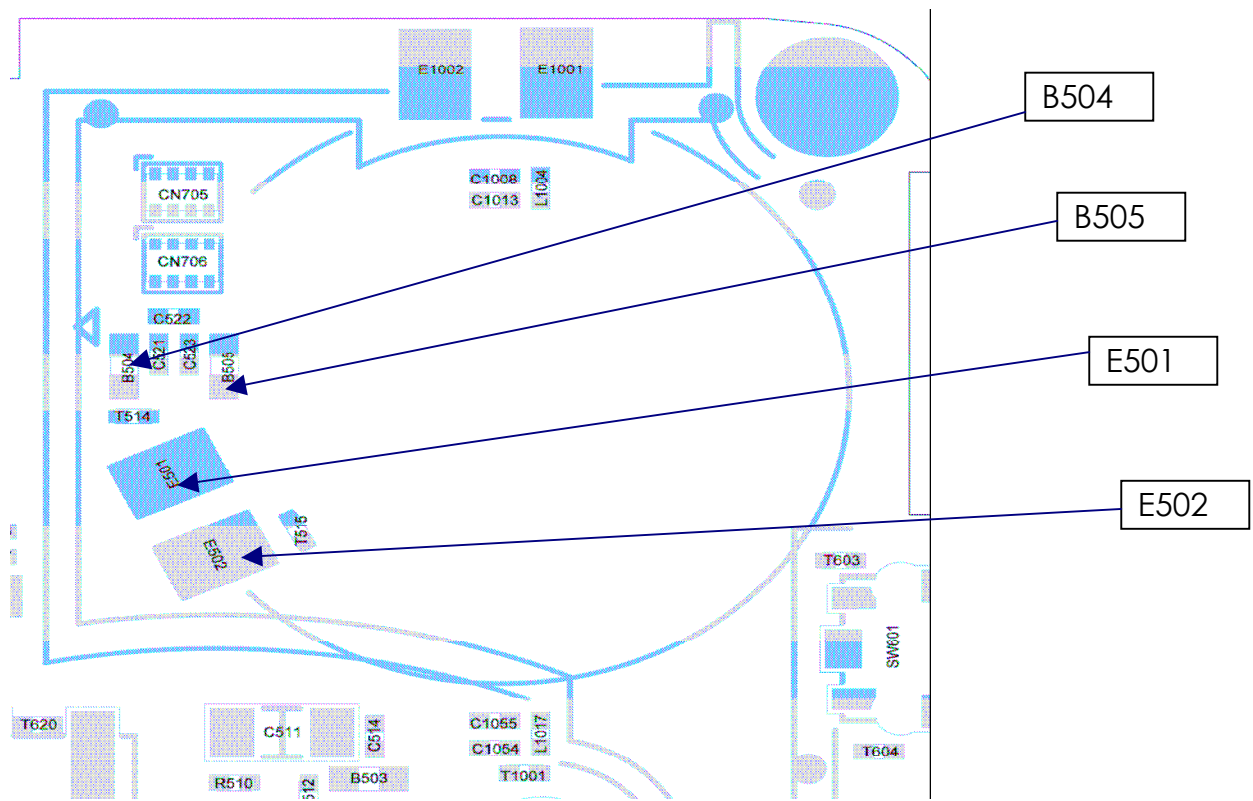
Measuring point as below (Bottom Side):



No audio from speaker

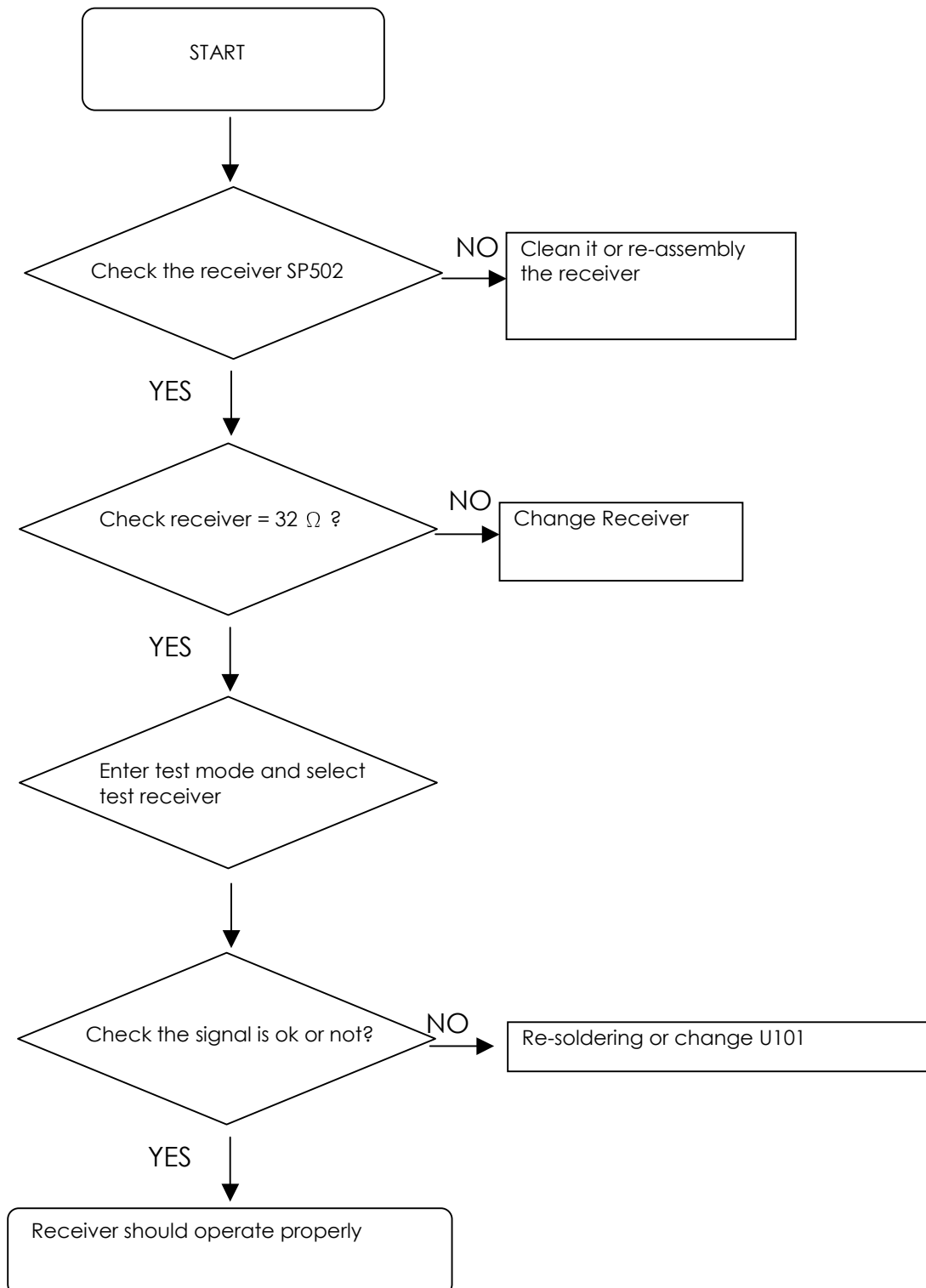


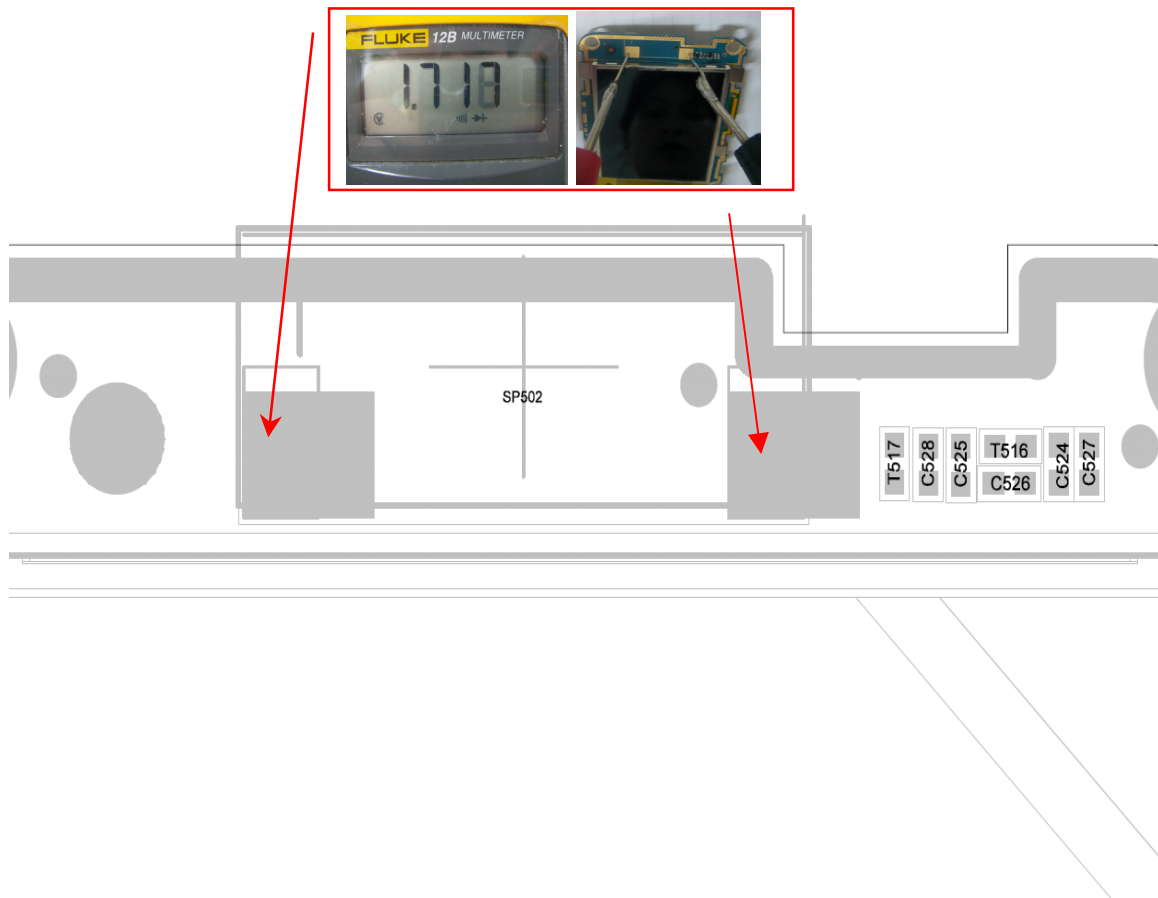
Measuring point as below (Bottom Side):



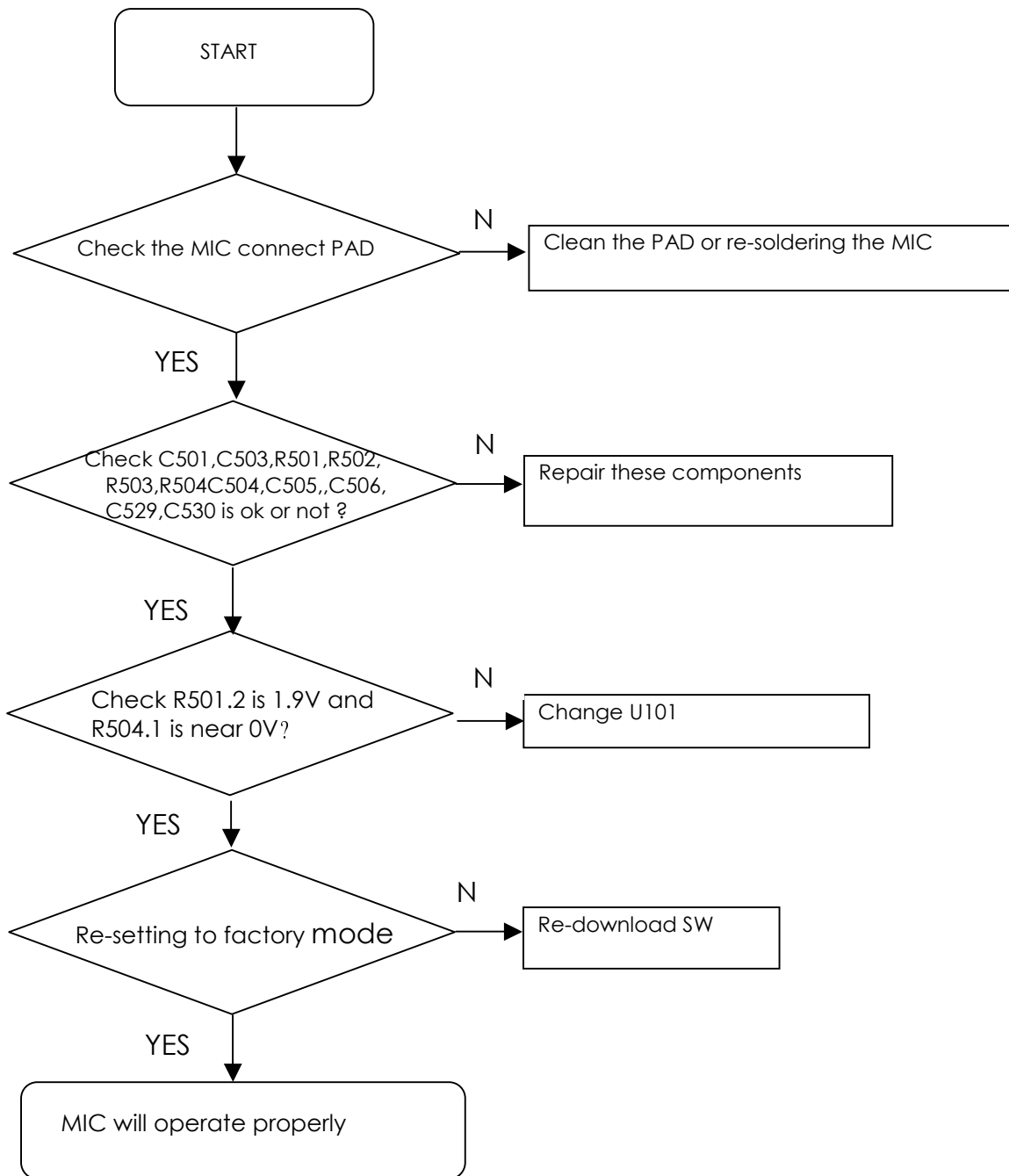
No audio from receiver

Repairing Procedure:

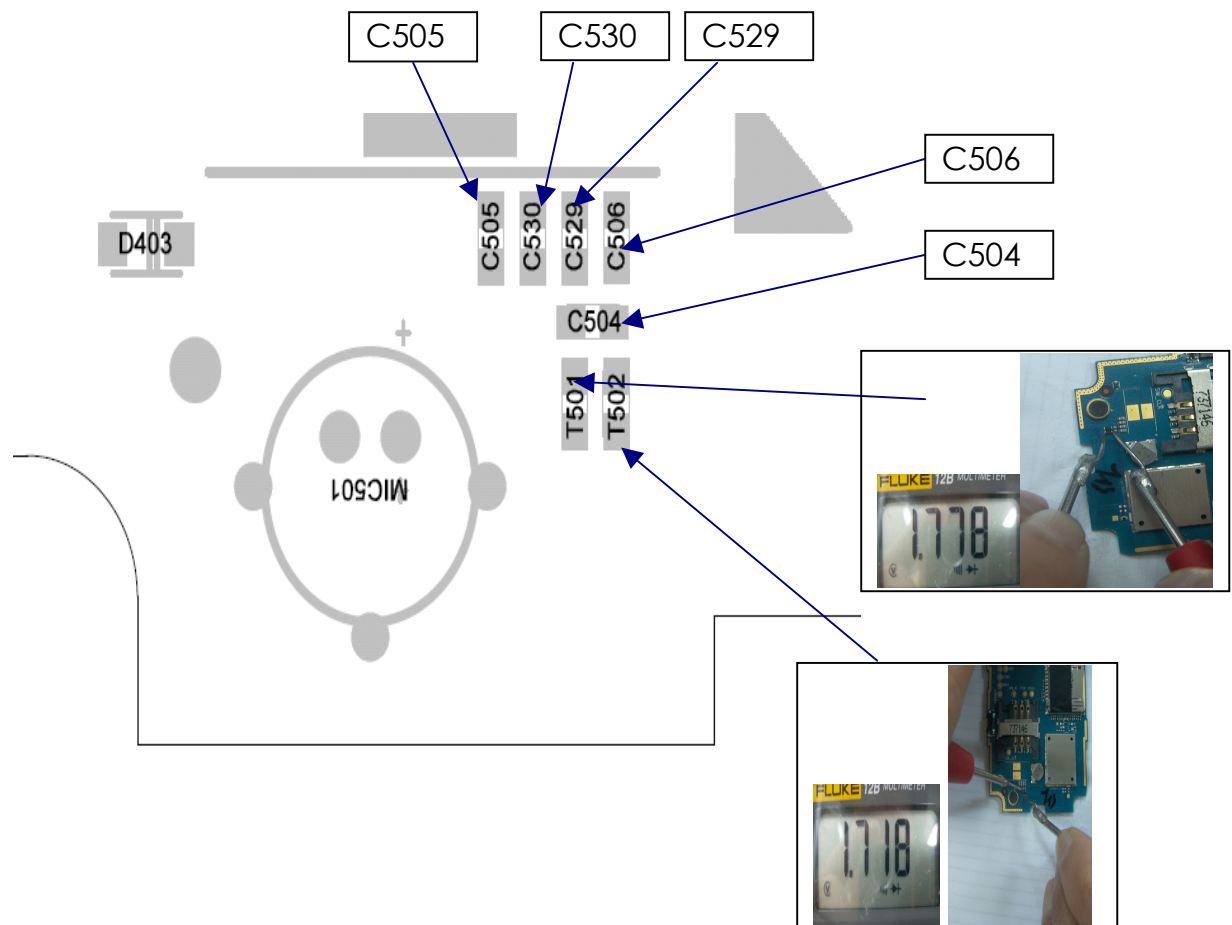




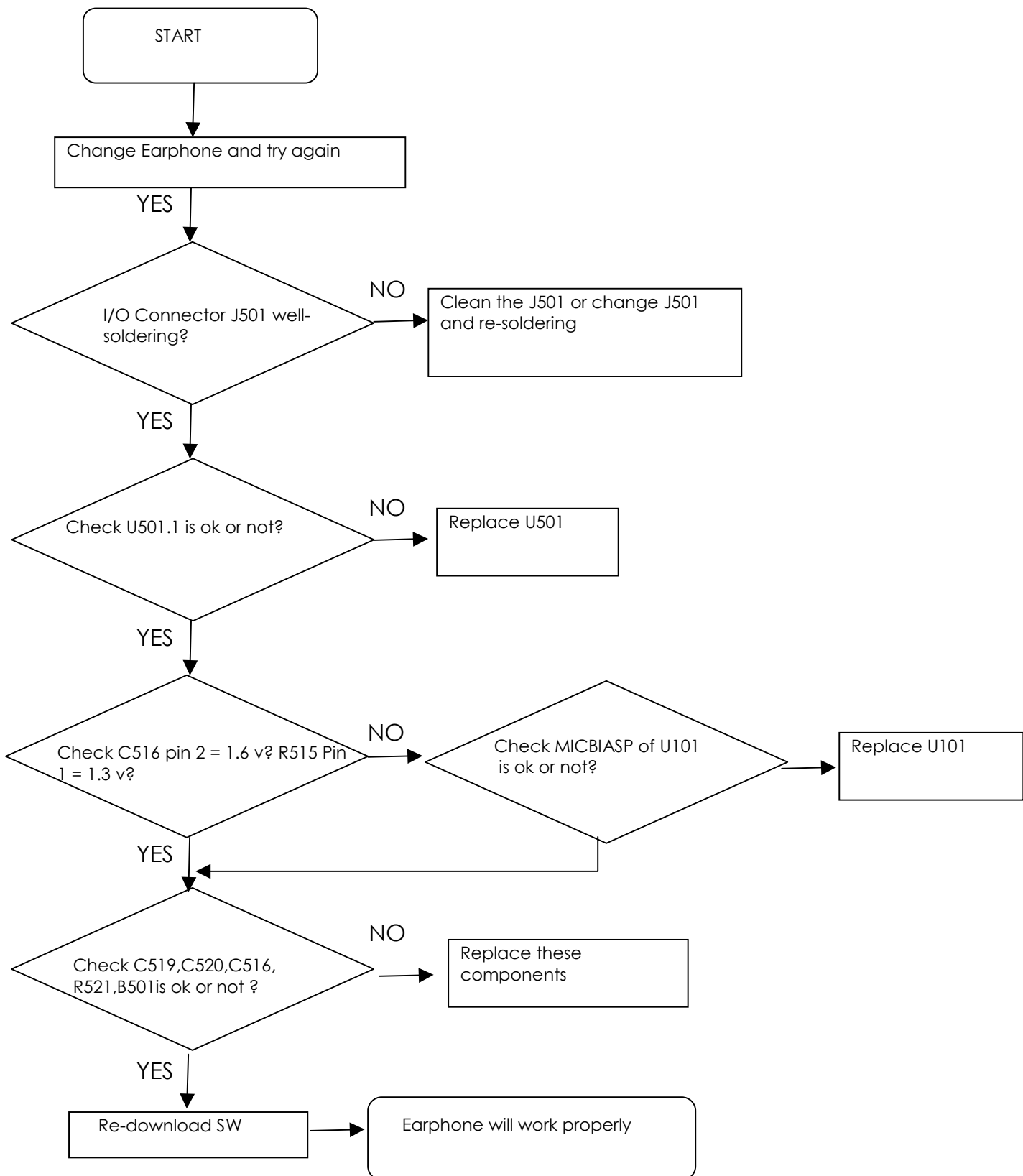
No audio from MIC



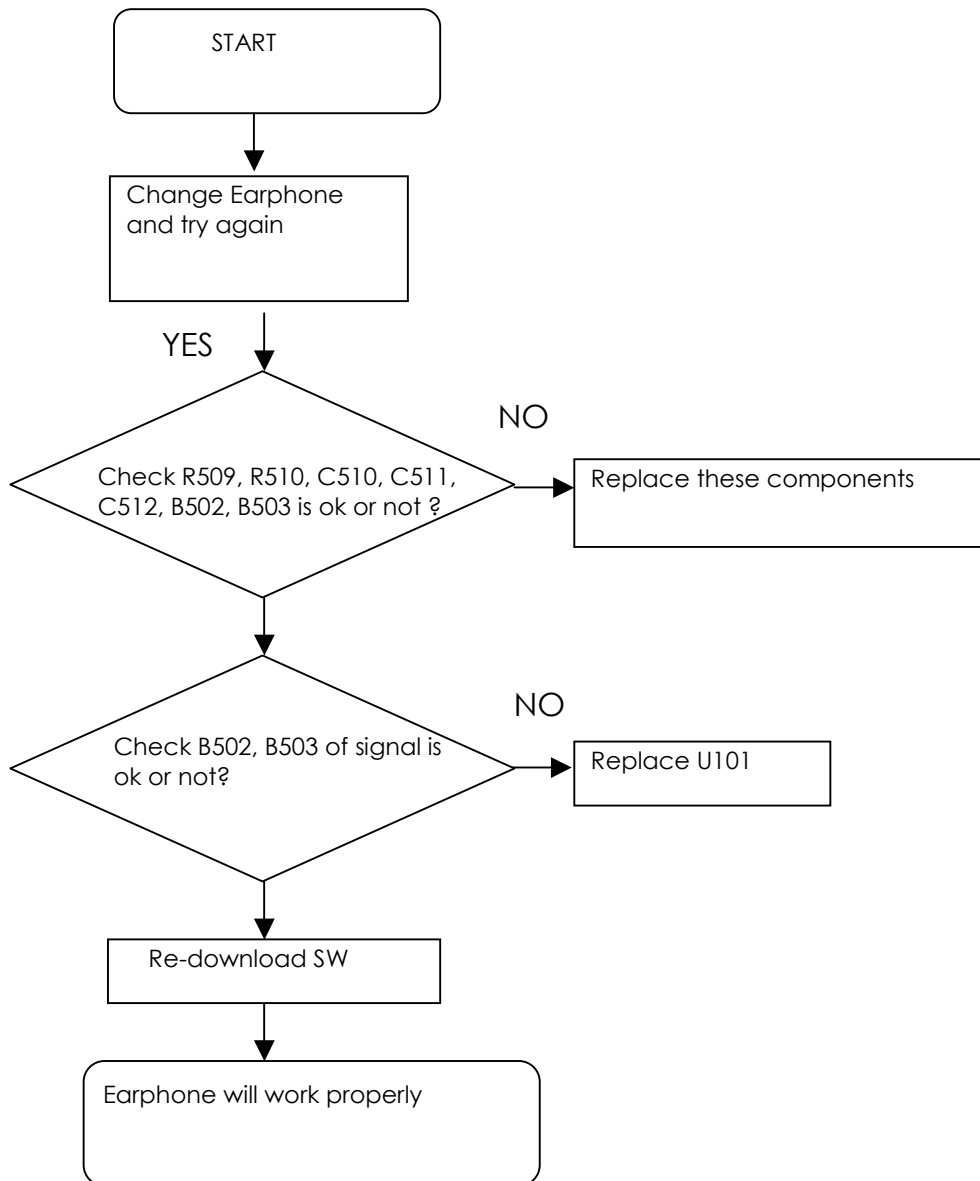




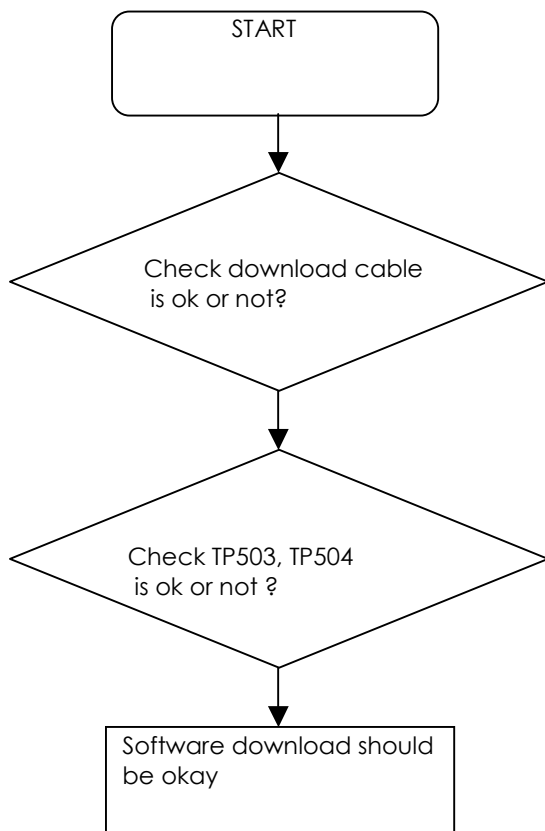
No audio from hand free(ear-MIC)



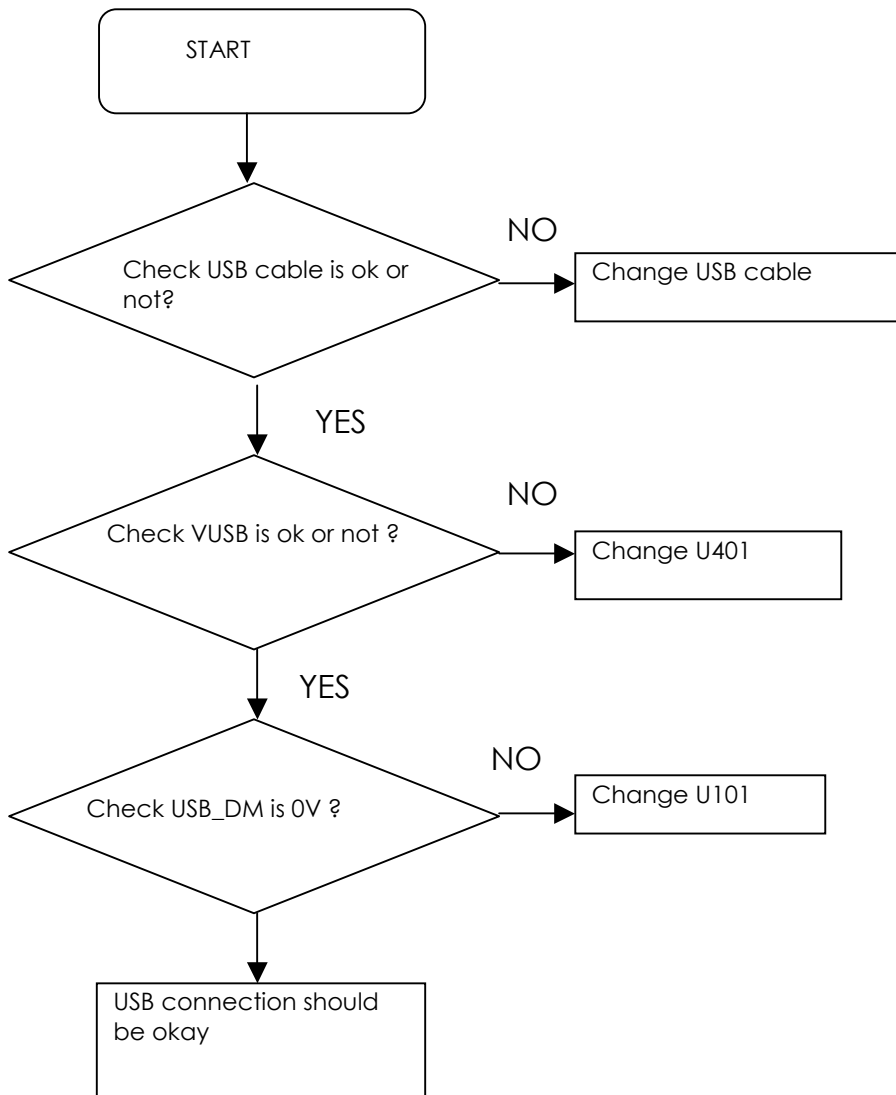
No audio from hand free(Play mp3)



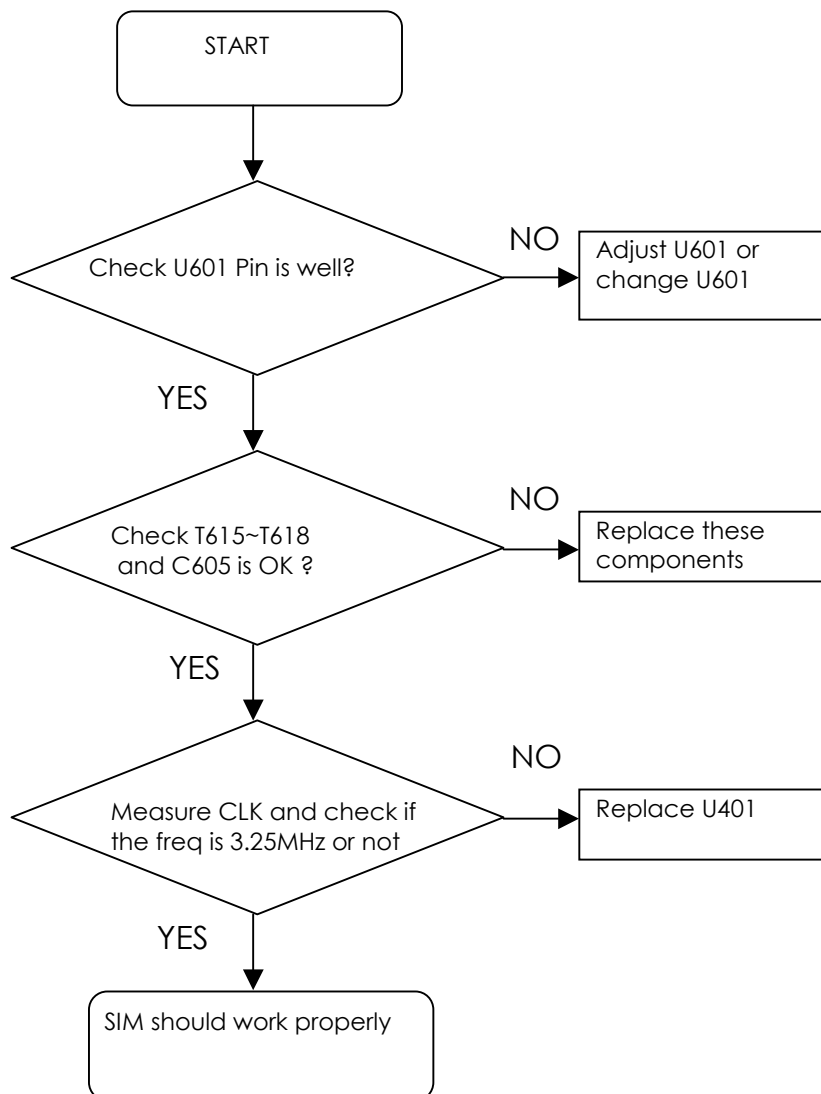
Can not download SW

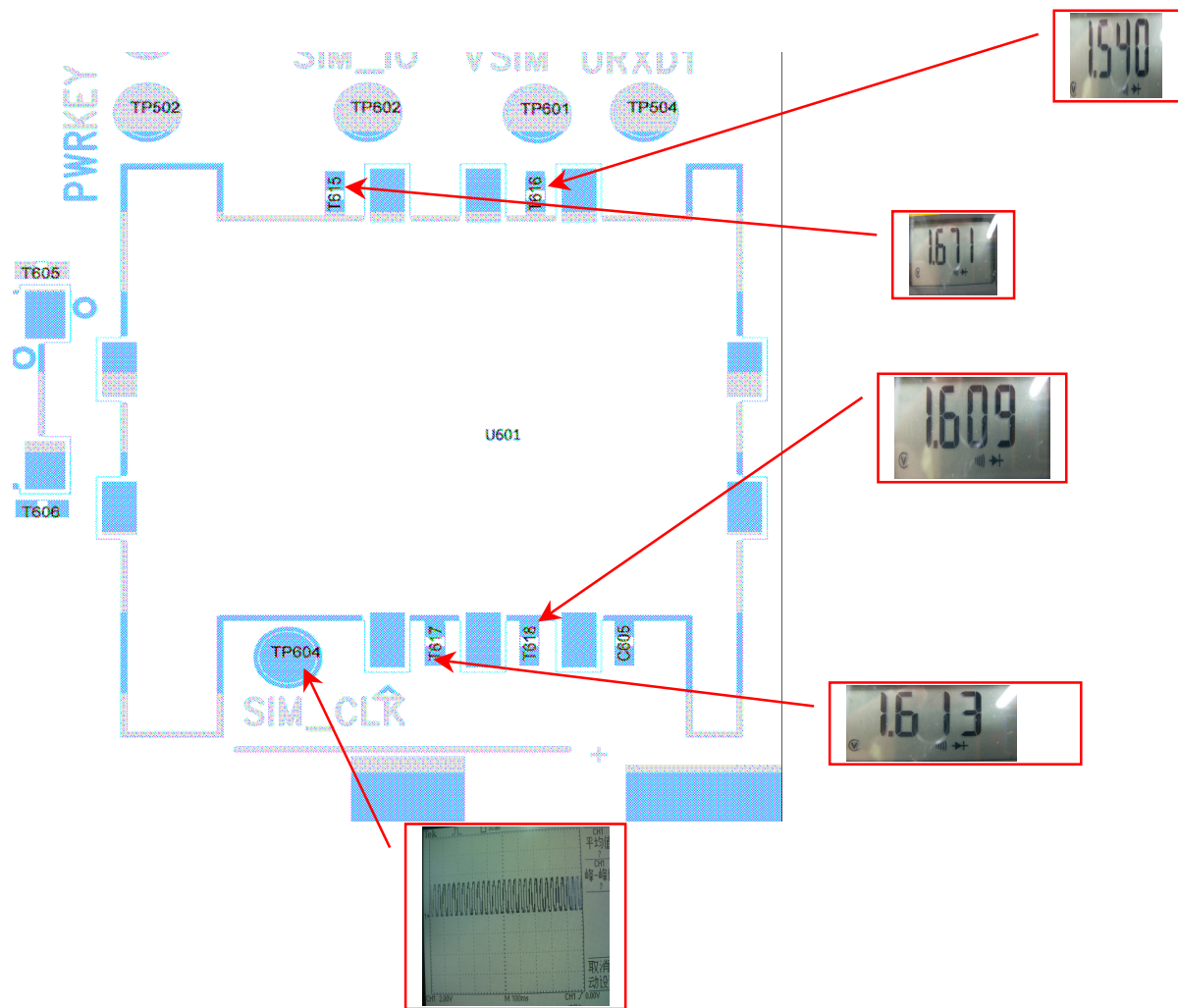


Can not connect USB

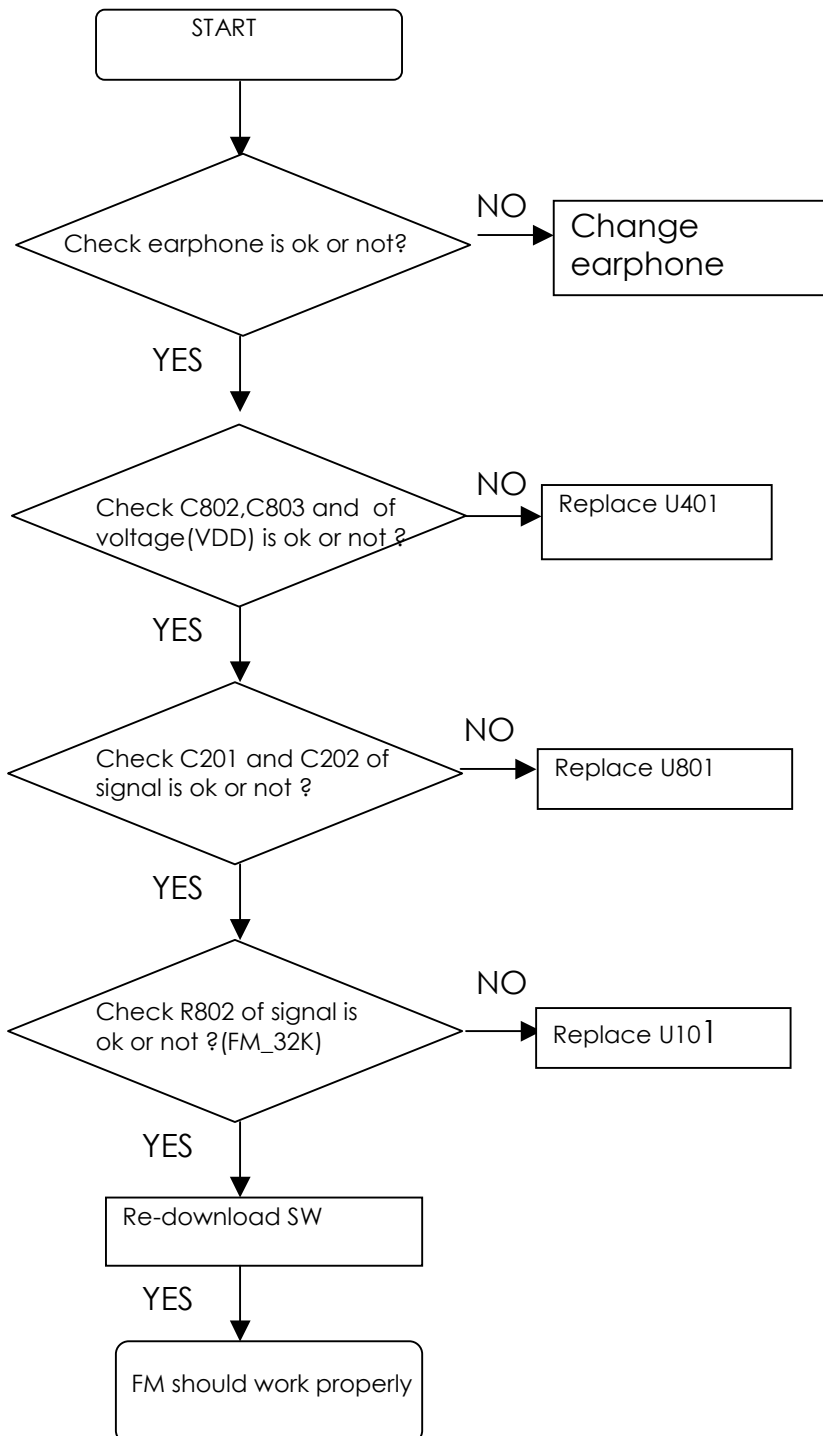


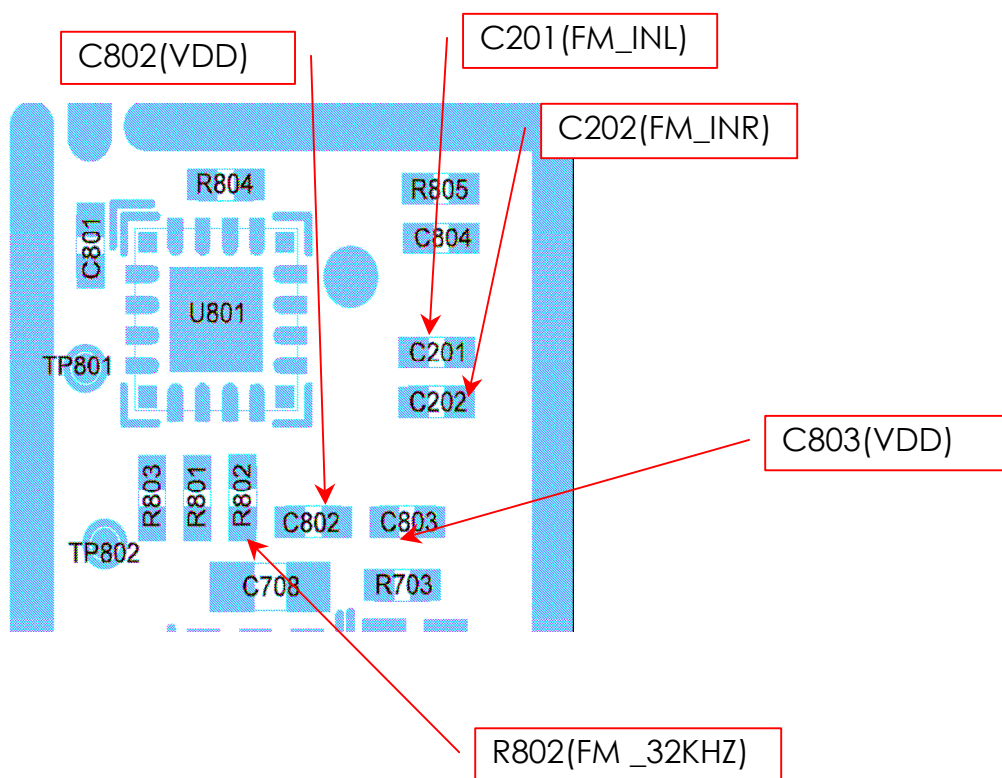
Can not recognize SIM card



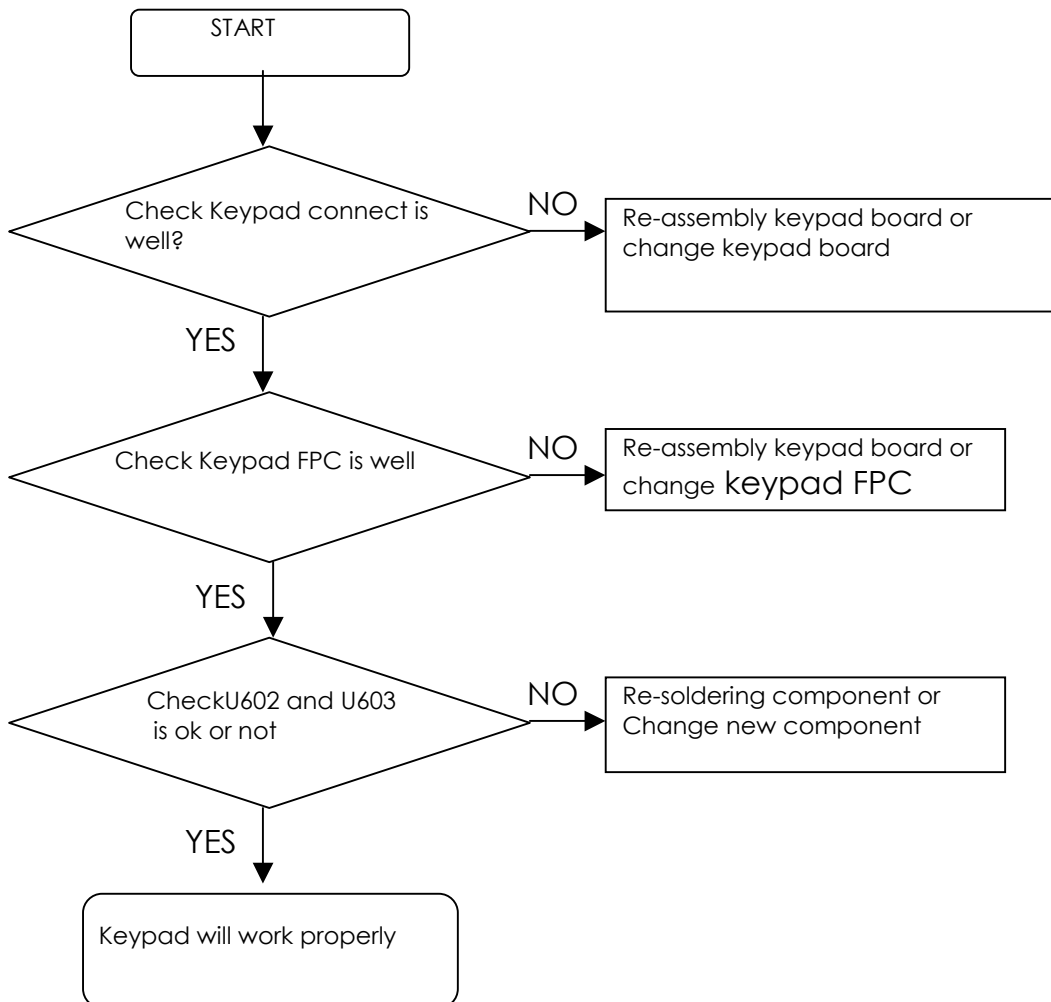


Can not listen FM radio

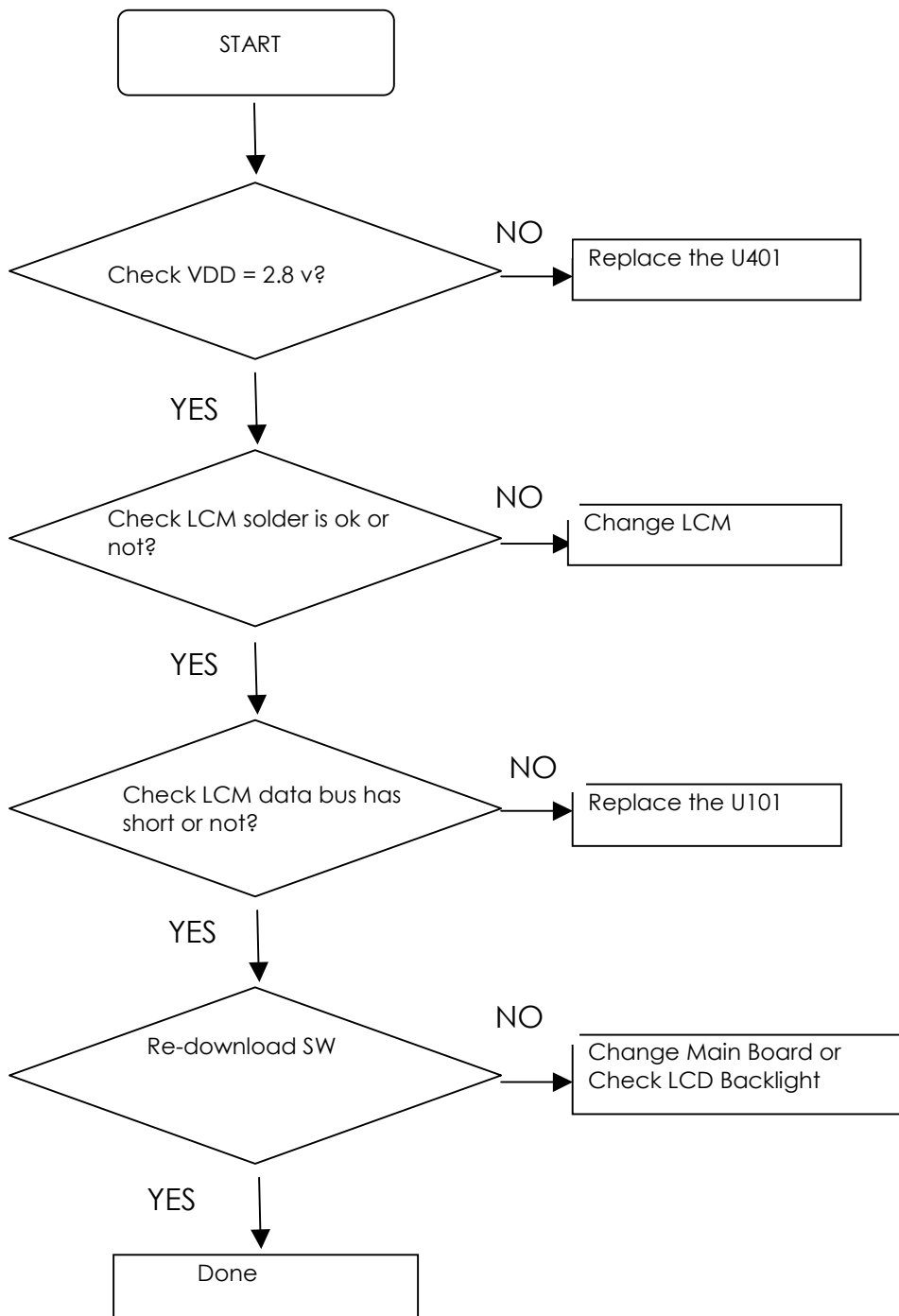




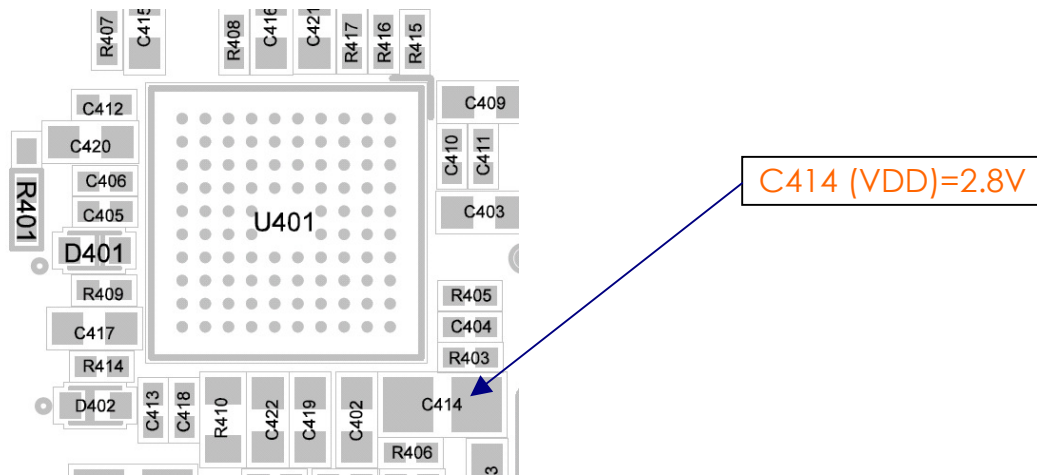
Keypad no function



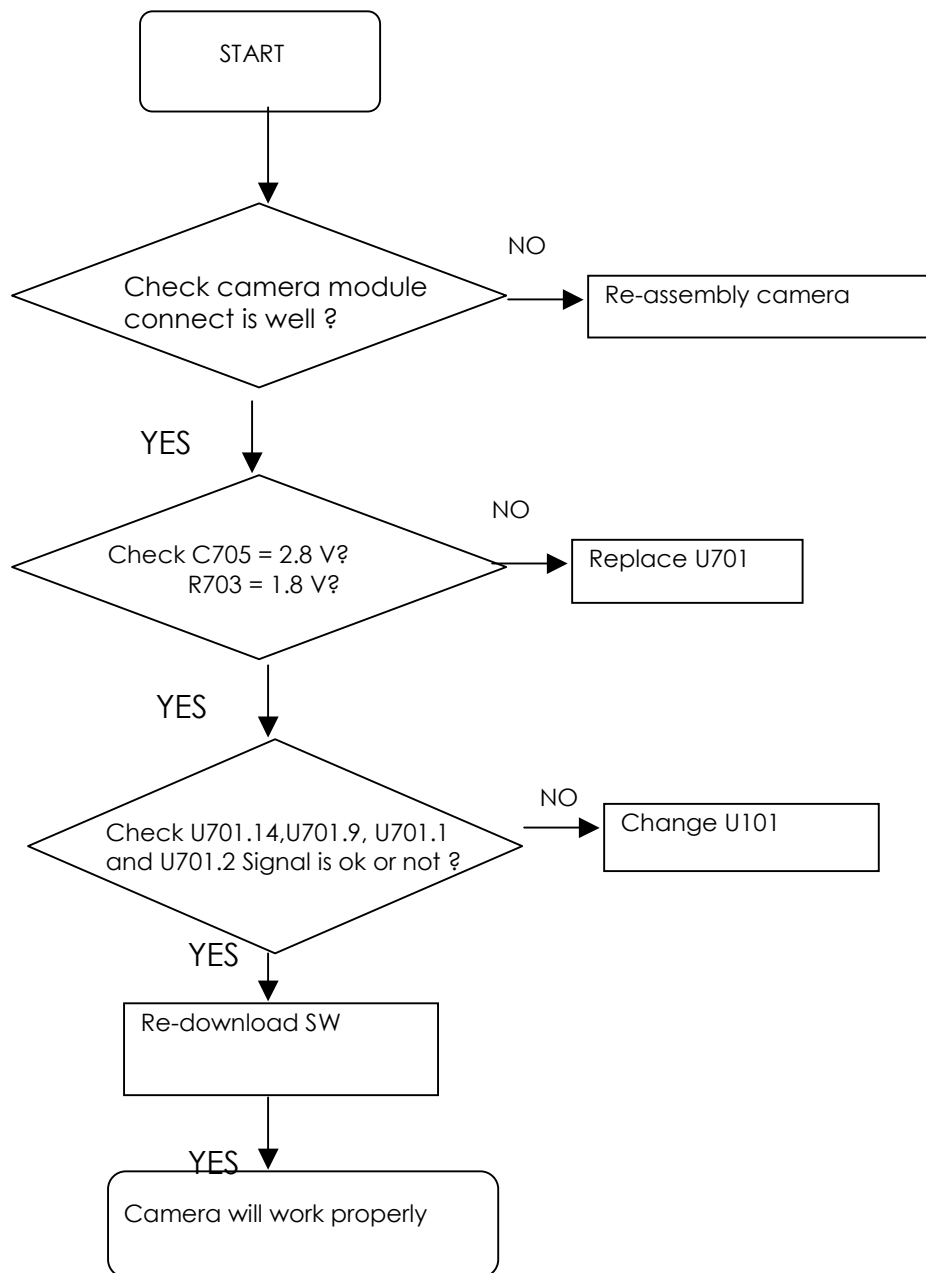
No display

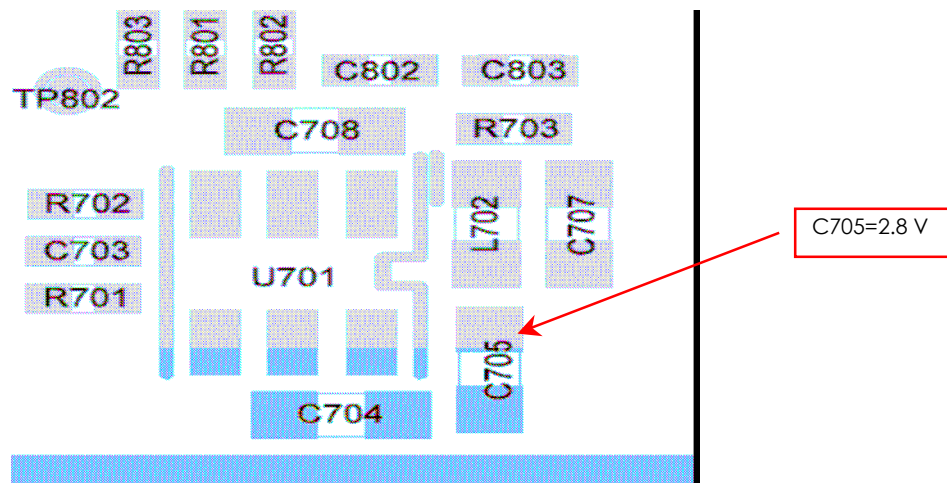


Measuring point as below:



Camera problem



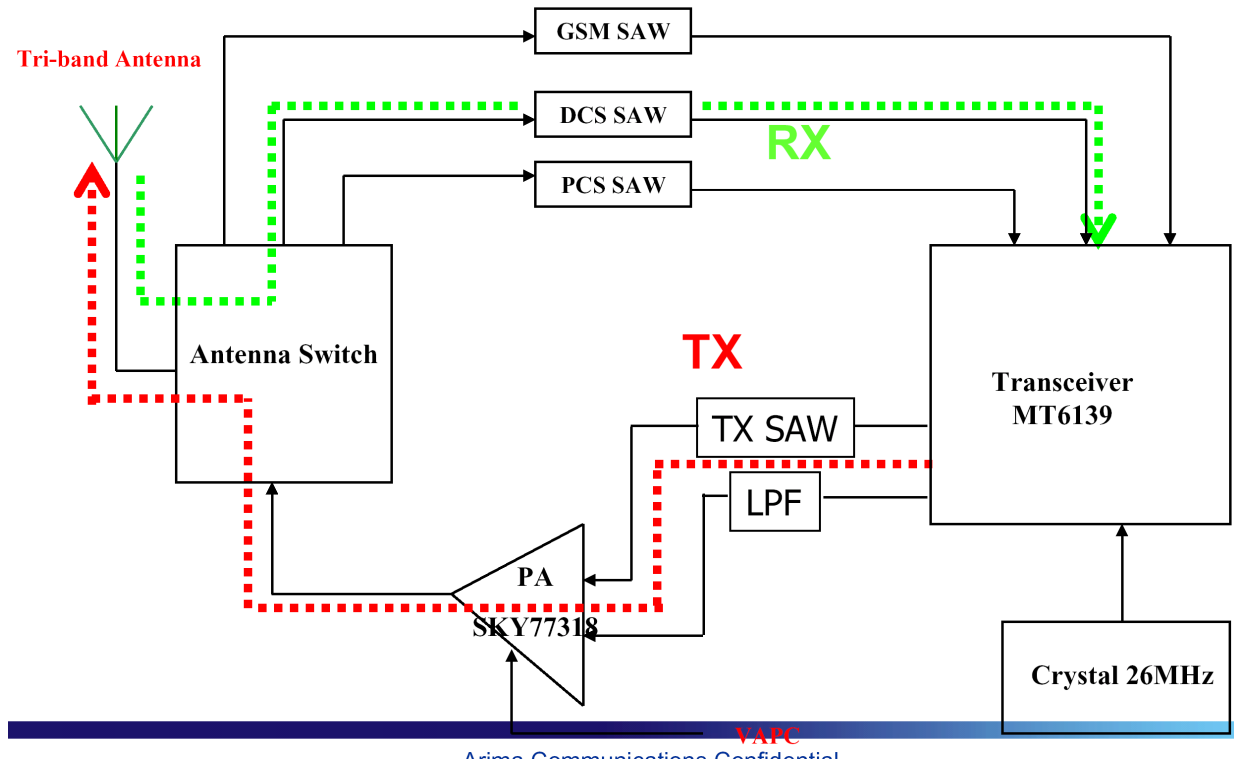


7-2-2 KP199 RF Trouble Shooting

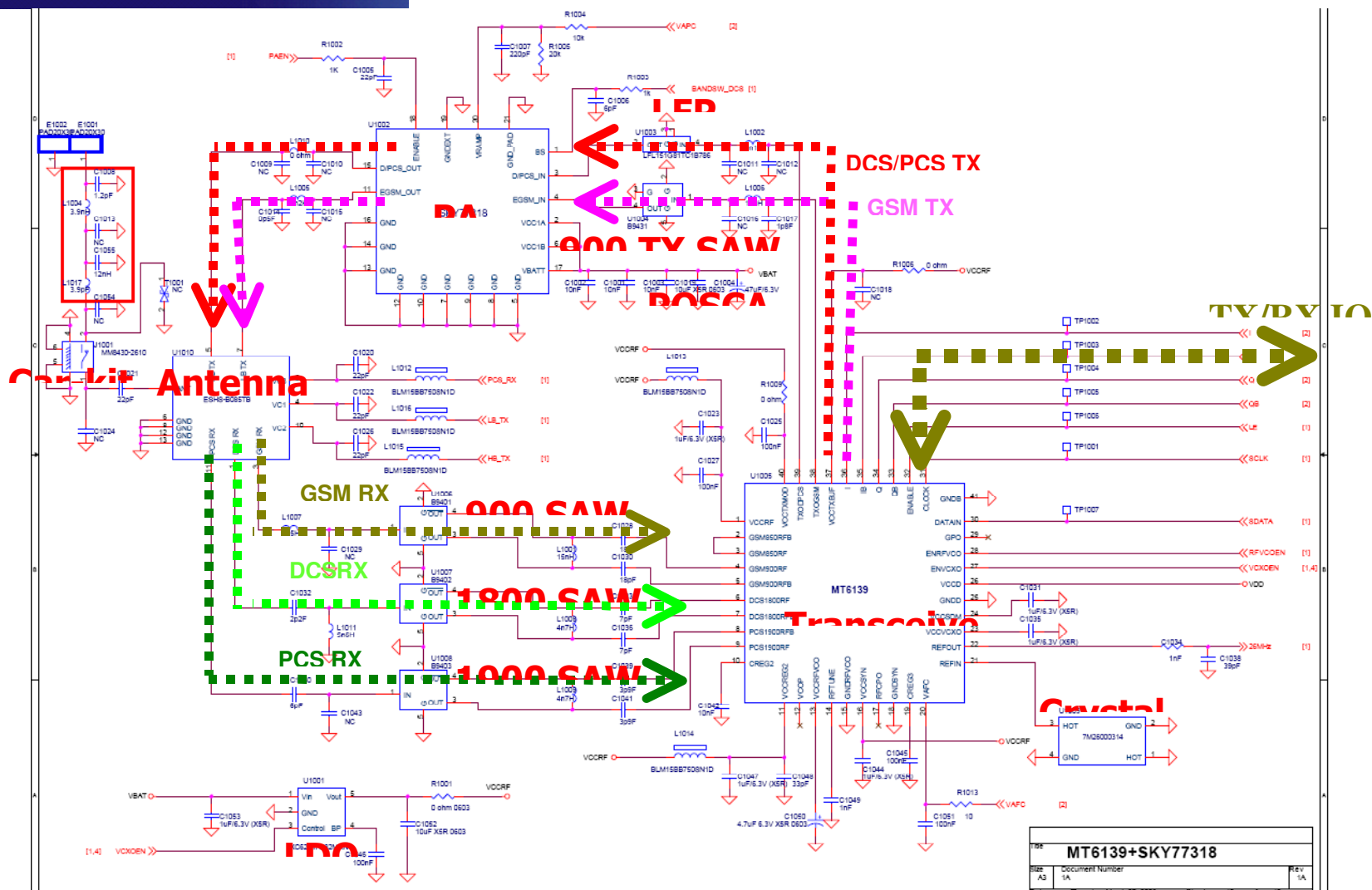
RF Introduction and Troubleshooting for 7339

- This document is specified in order to training and introduction to factory how to debug and troubleshooting with 7339 RF hardware.
- Bar type feature phone
- Tri-Band GSM/GPRS class10+BT V1.2+FM
- Key Components:
MT6139(Transceiver)+SKY77318(PA)+MT6226(BB)+MT6318(PMIC)+MT6601(BT)+SI4702(FM)

RF Block Diagram



RF Schematic



TX signal (GSM 900)

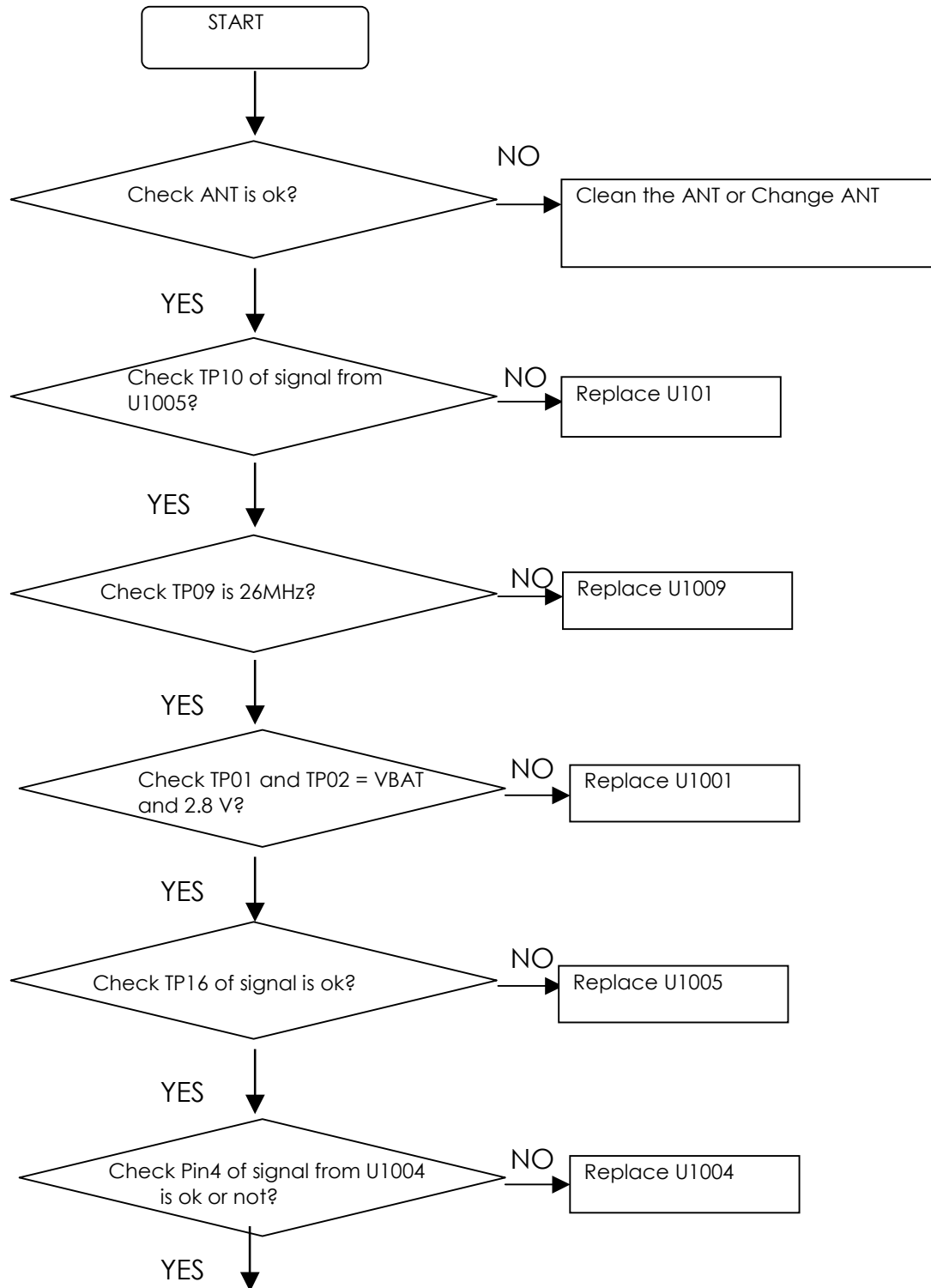
(1)Use META tool to connect PCBA

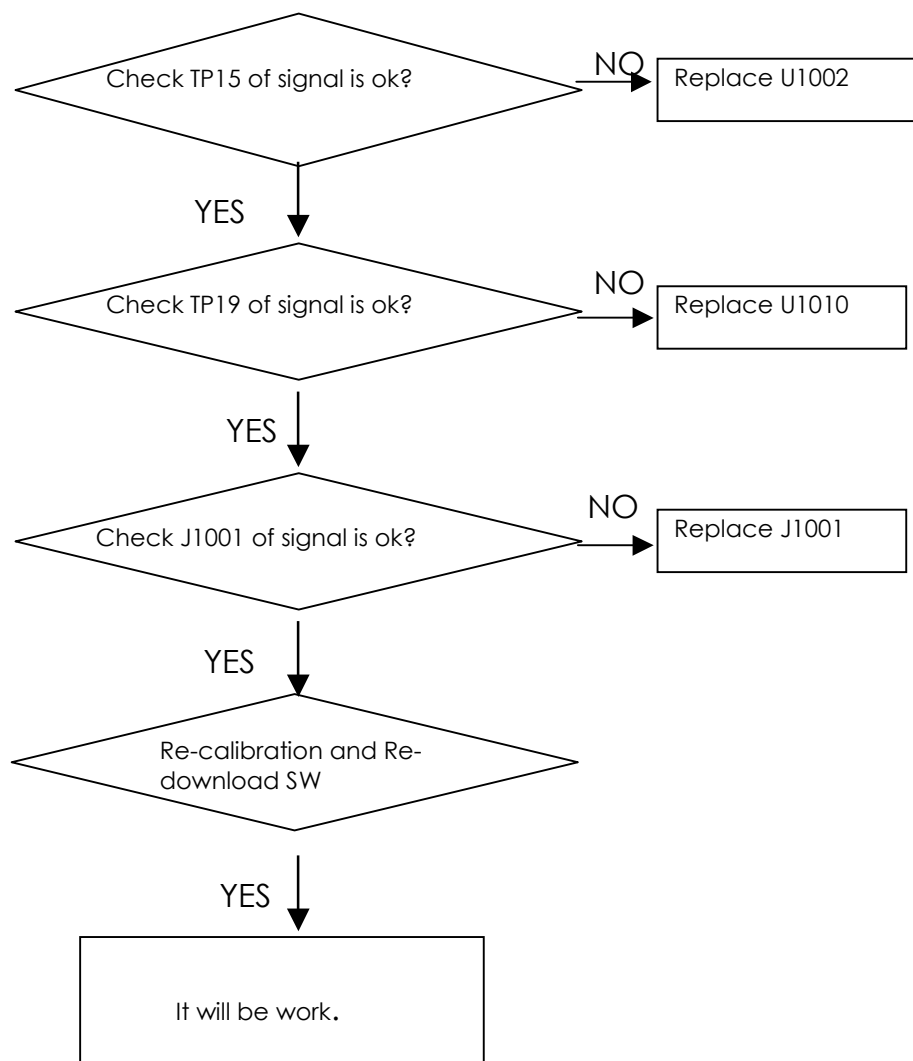
(2)Choose TX level and profile

(3)Band: GSM 900 ARFCN: 62 TSC: 5 PCL: 5 AFC: 4100

(4)Spectrum analyzer setting : FREQ: 902.4 MHz, SPAN: 20 MHz, RBW:300kHz,
VBW : 300kHz

Flow Chart





TX signal (GSM 1800)

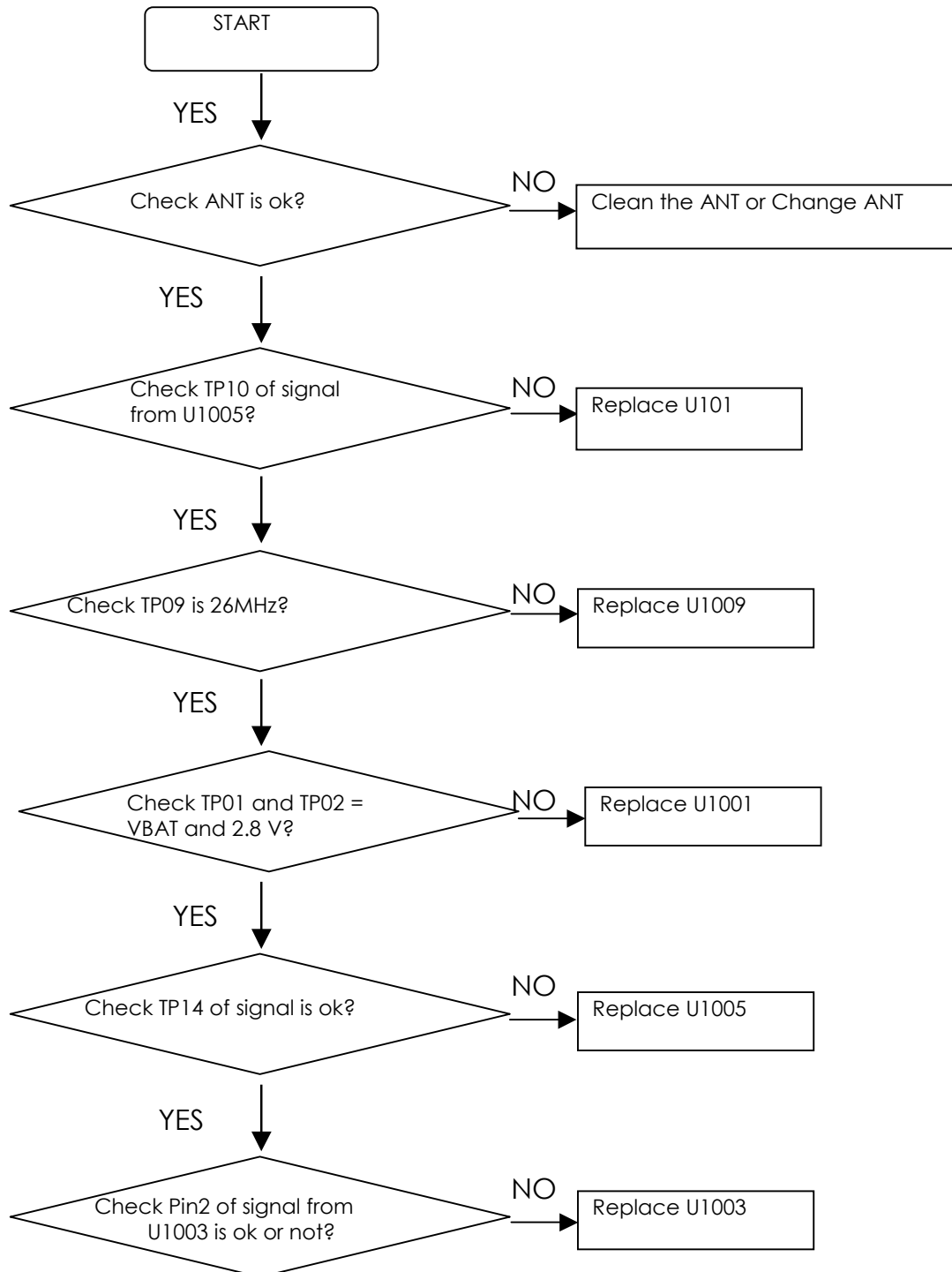
(1) Use Meta tool connect PCBA

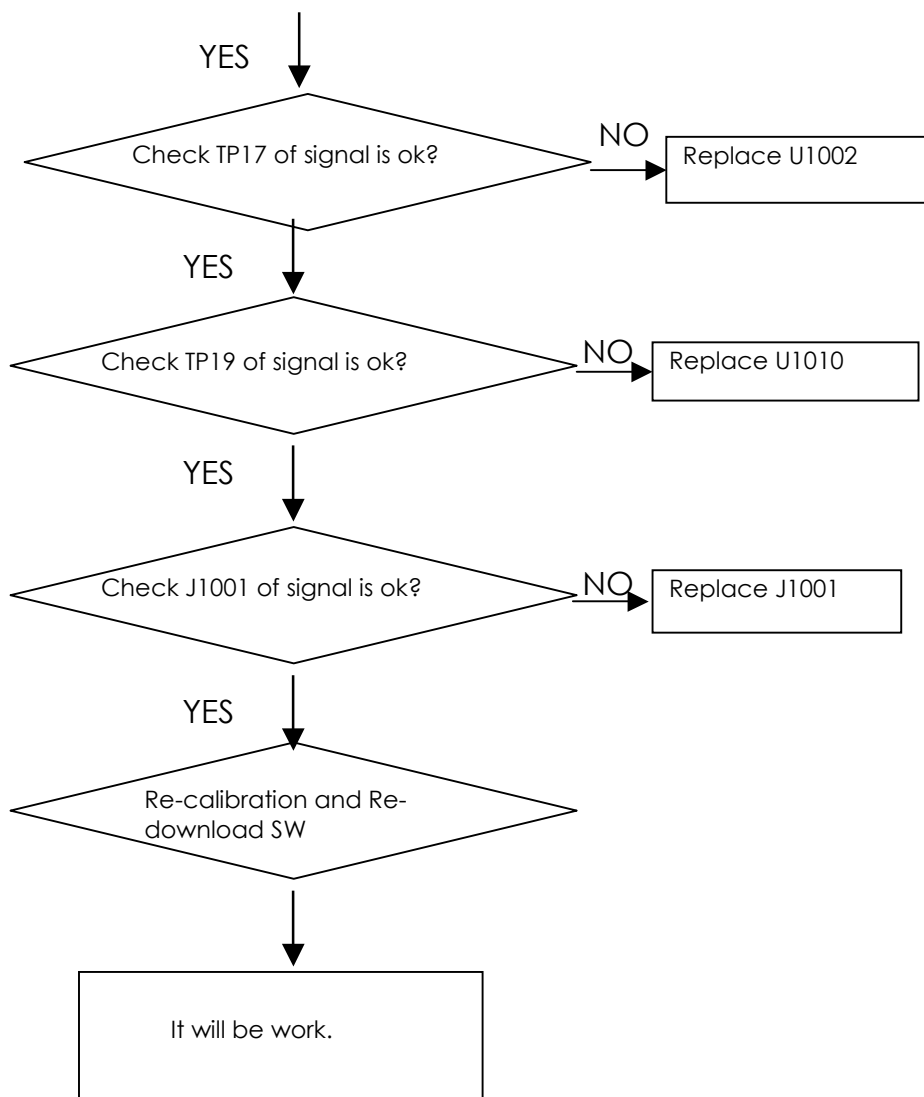
(2) Choose TX level and profile

(3) Band: GSM 1800 ARFCN: 700 TSC: 5 PCL: 0 AFC: 4100

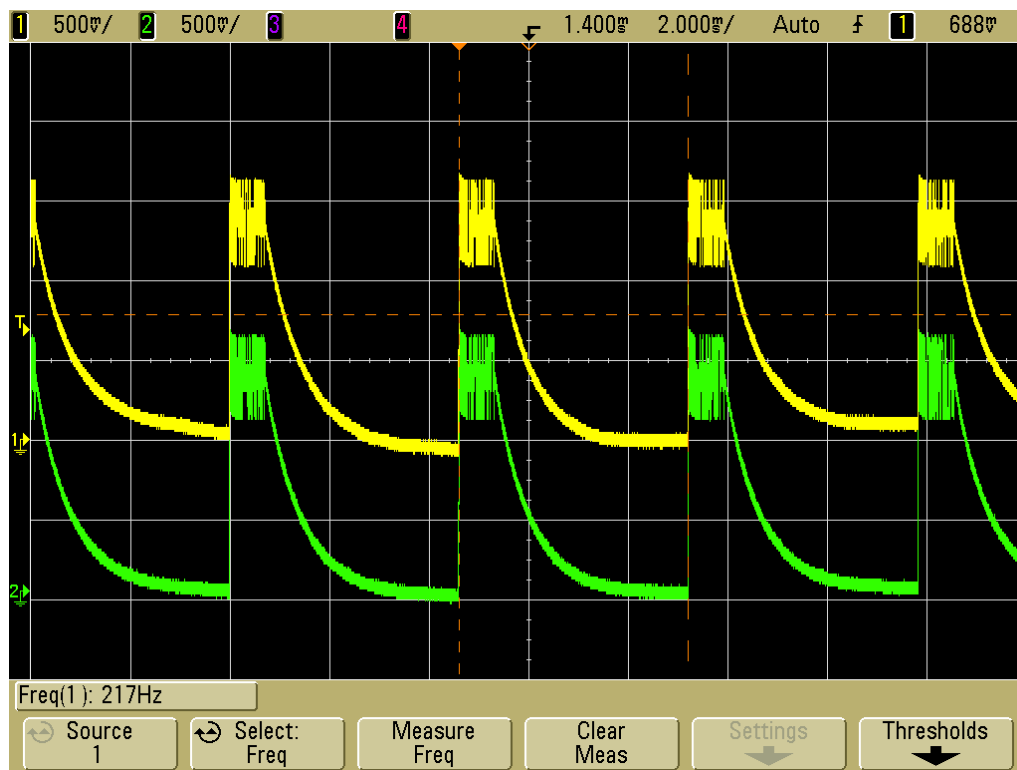
(4) Spectrum analyzer setting : FREQ: 1.7478GHz SPAN: 20 MHz, RBW:300kHz, VBW : 300kHz

Flow Chart

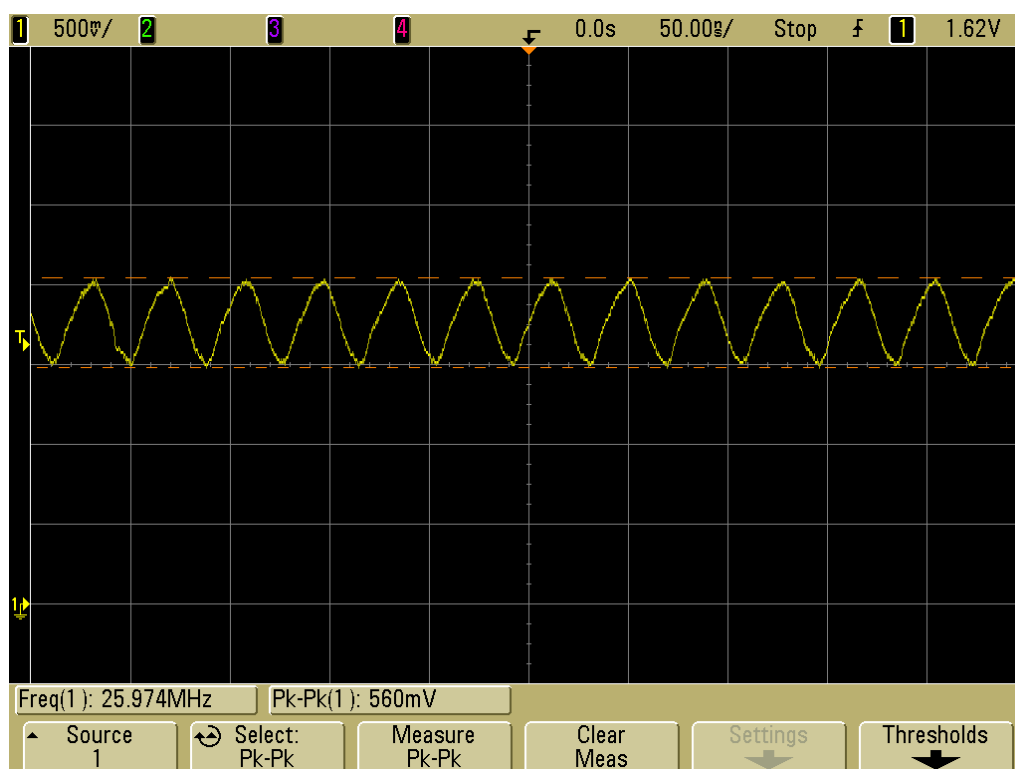




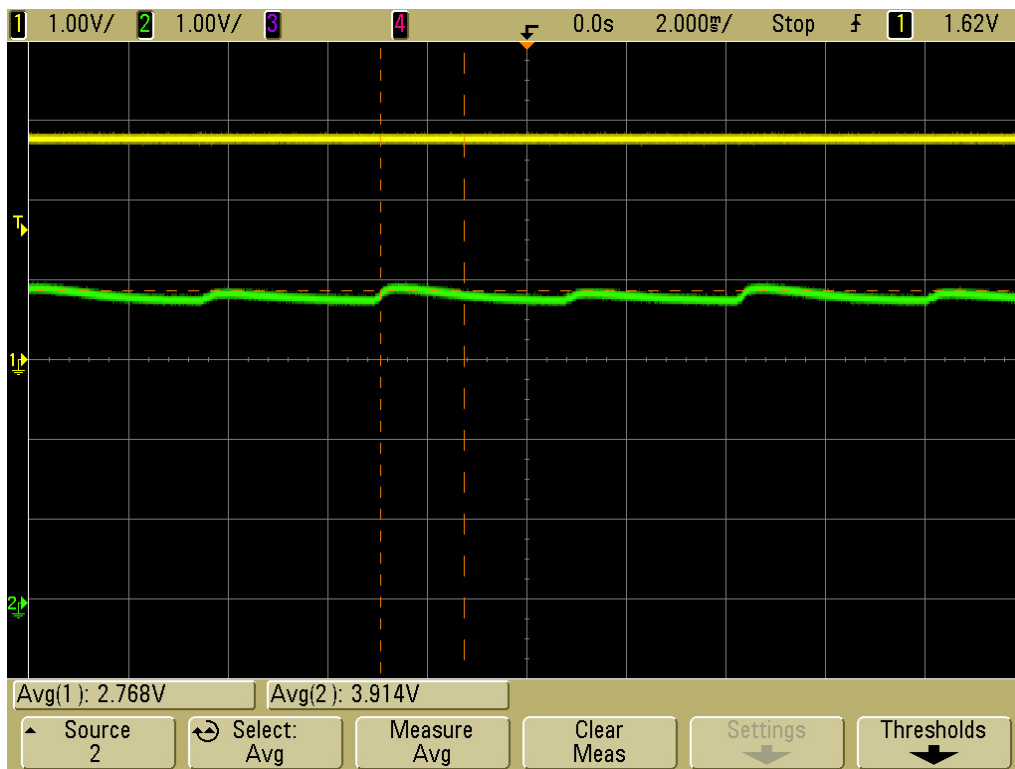
Measurement waveform example



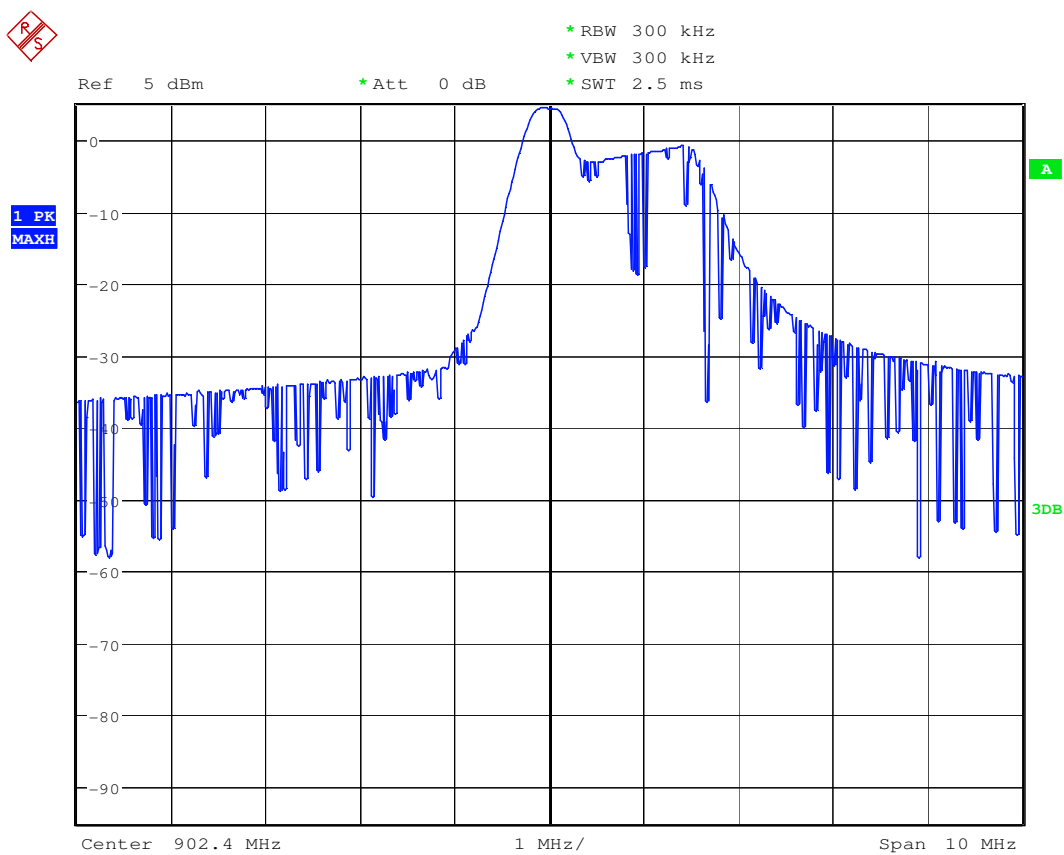
TP10 : yellow -> I , green -> IB



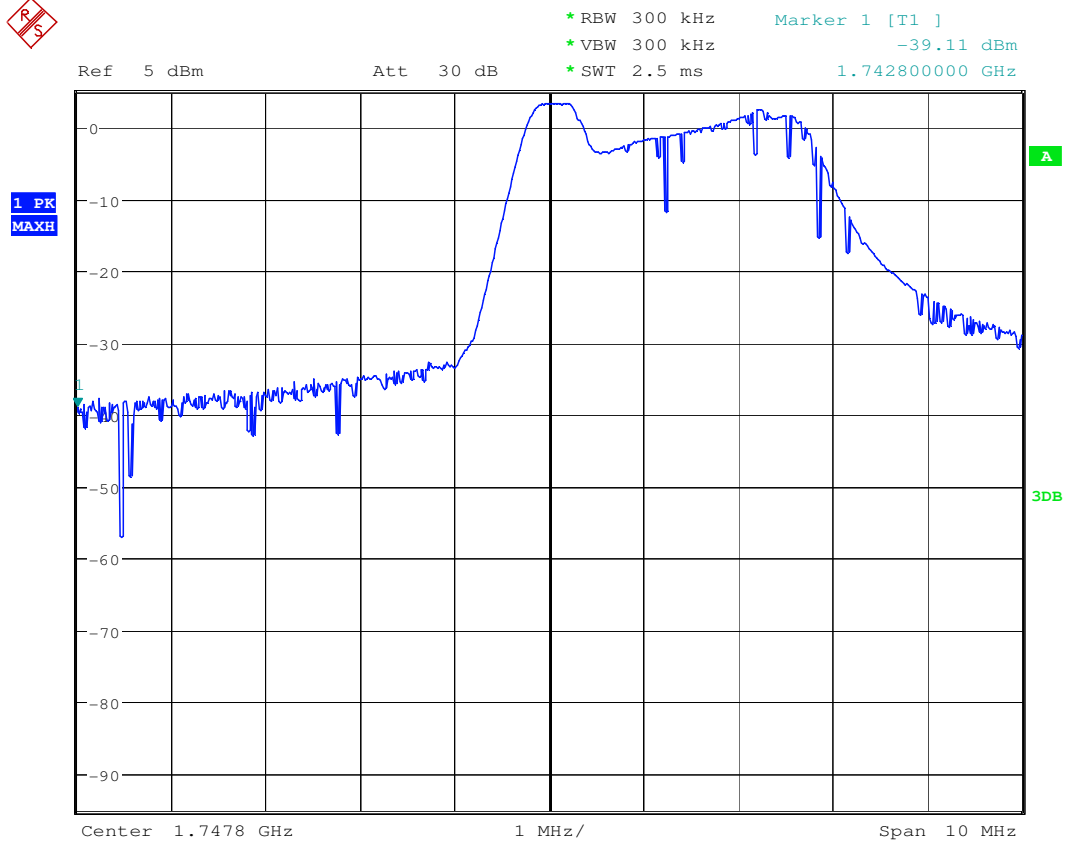
TP09 : 26MHz



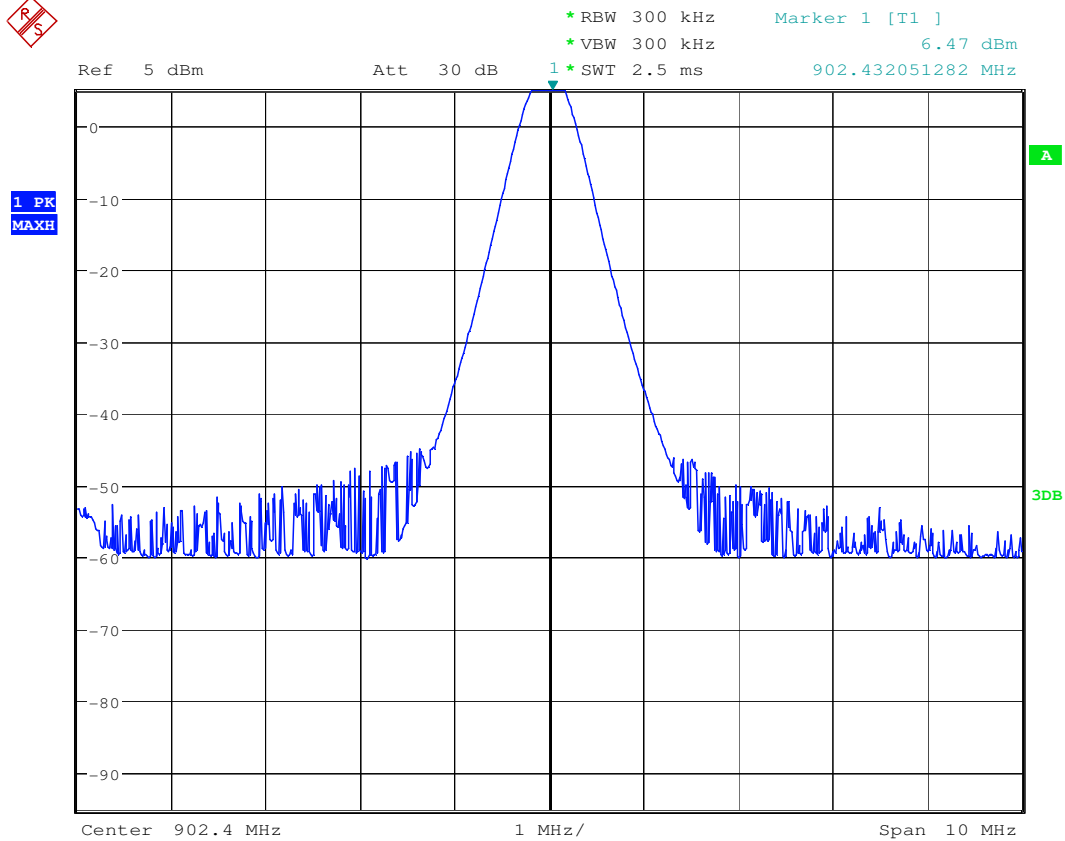
TP10 : yellow -> V_{BAT} , green -> V_{CCRF}



TP16 / Pin4 of U1004 : Input / Output of GSM TX SAW filter

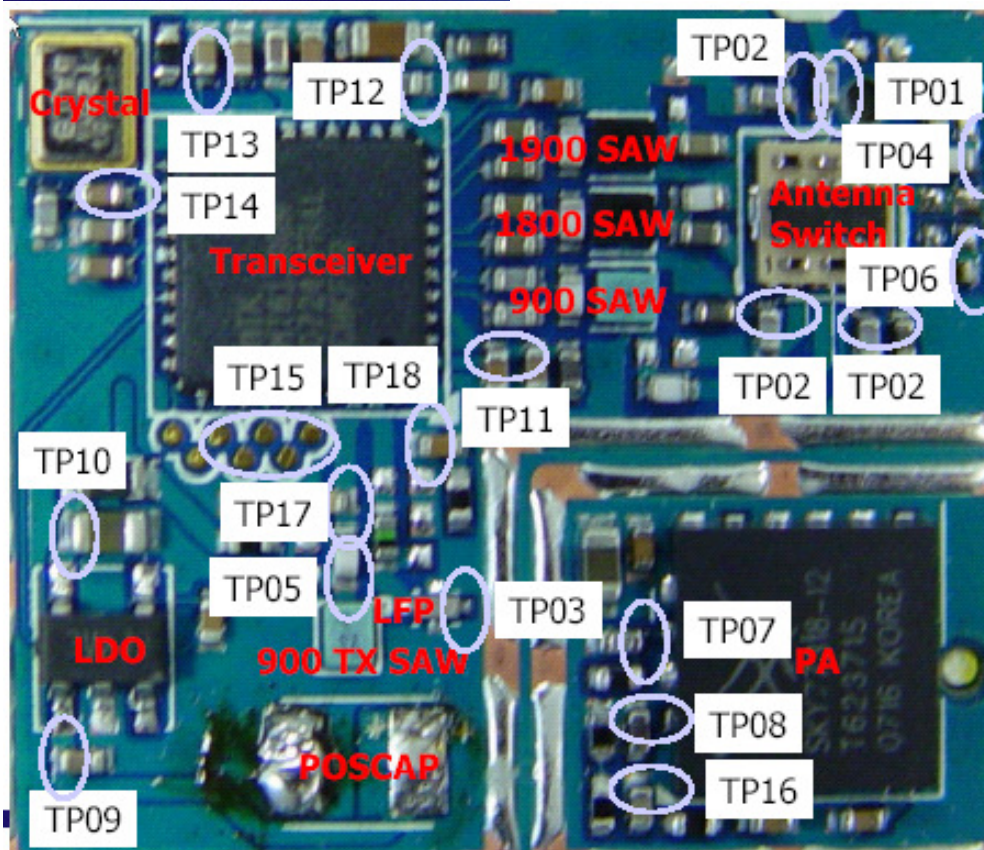


TP14 / Pin2 of U1002 : Input / Output of DCS TX lowpass filter



TP15 : PA output of GSM band

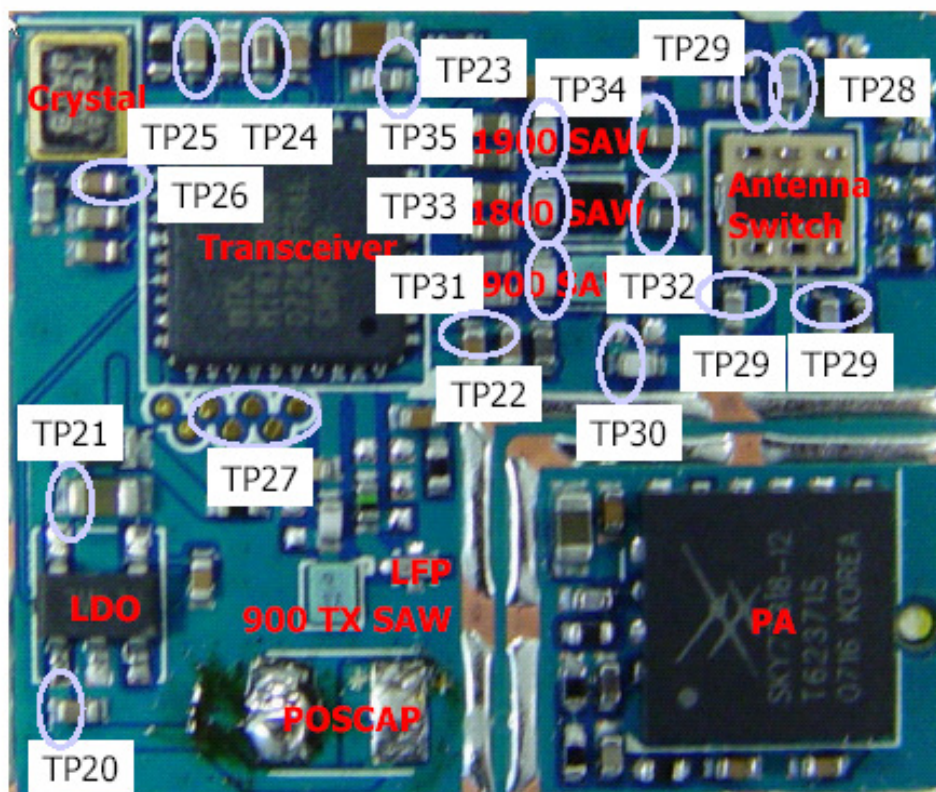
TX Placement



TX1 : GSM850_TX , EGSM_TX
TX2 : DCS_TX , PCS_TX
RX1 : GSM850_RX , EGSM_RX
RX2 : DCS_RX
RX3 : PCS_RX

TP01 : LDO IN(VBAT)
TP02 : LDO OUT(2.8V)
TP03 : VCCRF(2.8V)
TP04 : VCCREG2(2.8V)
TP05 : VCCSYN(2.8V)
TP06 : VCCTXBUF(2.8V)
TP07 : VCCTXMOD(2.8V)
TP08 : VAFC
TP09 : REFOUT(26MHz)
TP10 : I/IB/Q/QB
TP11 : PA BS(GSM:0V, DCS/PCS: 2.8V)
TP12 : PA ENABLE(2.8V)
TP13 : PA VRAMP
TP14 : LFP OUT(1805~1990)
TP15 : PA GSM OUT(880~915)
TP16 : TX SAW IN(880~915)
TP17 : PA DCS/PCS OUT(1805~1990)
TP18 : VC1/VC2/VC3(2.8V)
TP19 : ANT (signal)

RX Placement

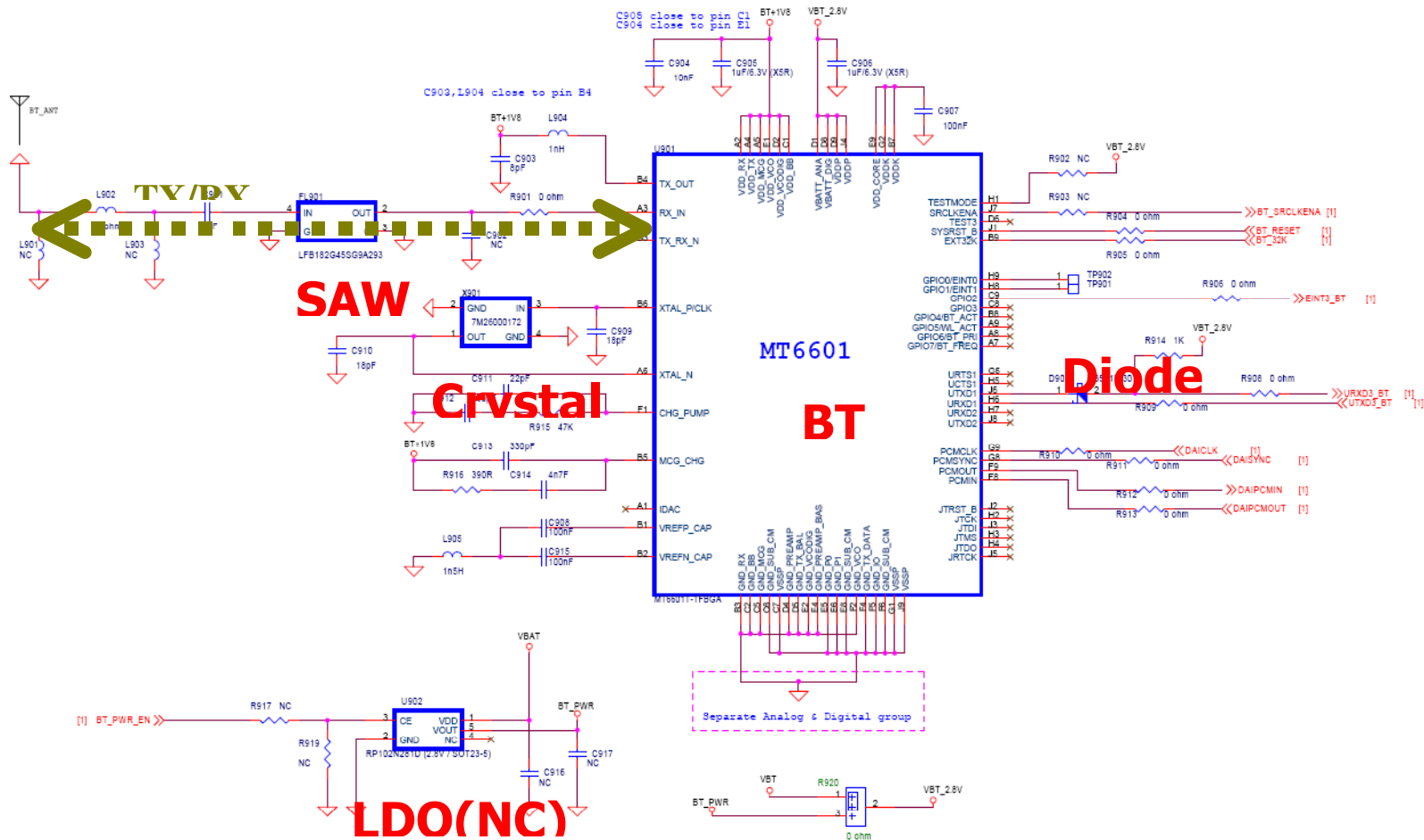


mode	VC1	VC2	VC3
TX1	H	L	L
TX2	L	H	H
RX1	L	L	L
RX2	L	L	L
RX3	L	L	H

TX1 : GSM850_TX , EGSM_TX
TX2 : DCS_TX , PCS_TX
RX1 : GSM850_RX , EGSM_RX
RX2 : DCS_RX
RX3 : PCS_RX

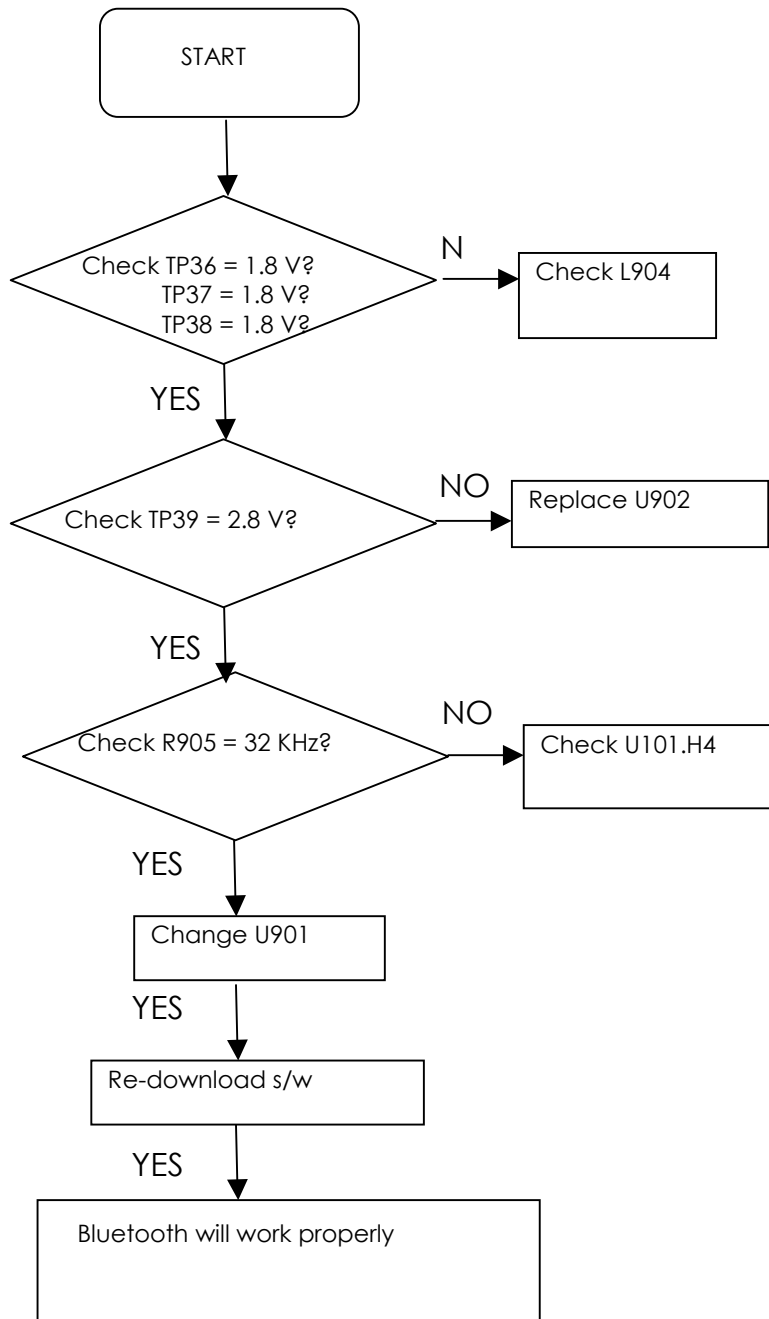
TP20 : LDO IN(VBAT)
TP21 : LDO OUT(2.8V)
TP22 : VCCRF(2.8V)
TP23 : VCCREG2(2.8V)
TP24 : VCCSYN(2.8V)
TP25 : VAFC
TP26 : REFOUT(26MHz)
TP27 : I/IB/Q/QB
TP28 : ANT (signal input)
TP29 : VC1/VC2/VC3(2.8V)
TP30 : GSM SAW IN(925~960)
TP31 : GSM SAW OUT(925~960)
TP32 : DCS SAW IN(1805~1880)
TP33 : DCS SAW OUT(1805~1880)
TP34 : PCS SAW IN(1930~1990)
TP35 : PCS SAW IN(1930~1990)

BT Schematic

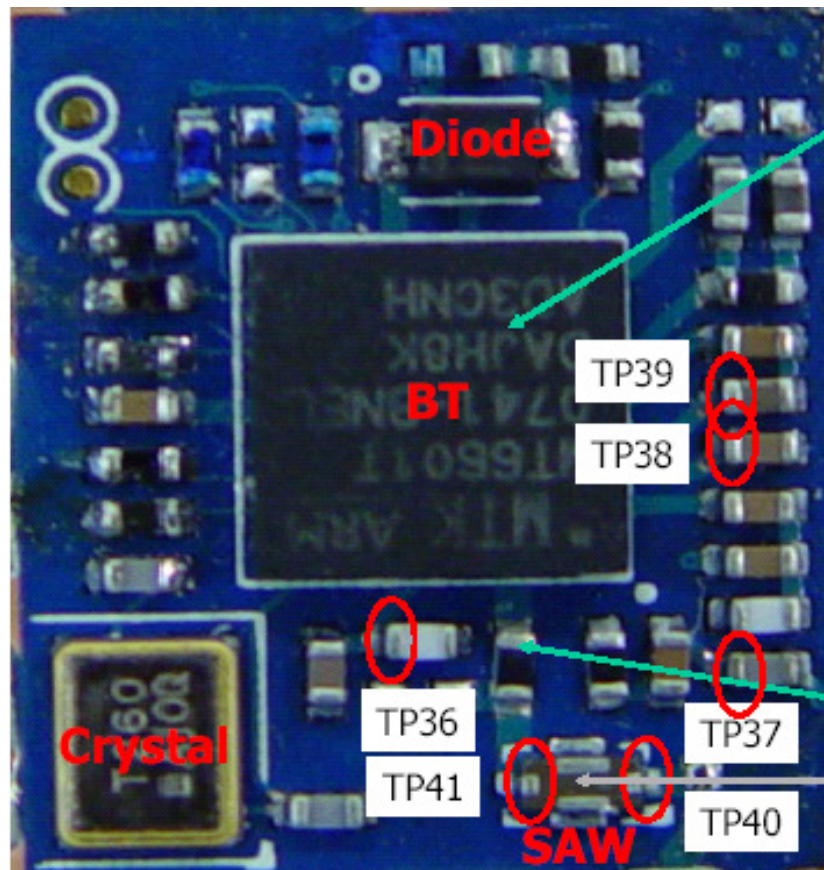


Bluetooth problem

Flow chart



BT Placement



U901

TP36 : TX_OUT(1.8V)
 TP37 : MCG_CHG(1.8V)
 TP38 : VDD_RX(1.8V)
 VDD_TX(1.8V)
 VDD_MCG(1.8V)
 VDD_VCO(1.8V)
 VDD_VCODIG(1.8V)
 VDD_BB(1.8V)
 TP39 : VBATT_ANA(2.8V)
 VBATT_DIG(2.8V)
 VDDP(2.8V)
 TP40 : SAW IN pin4(~2.242GHz)
 TP41 : SAW OUT pin2(~2.242GHz)

Pin A3

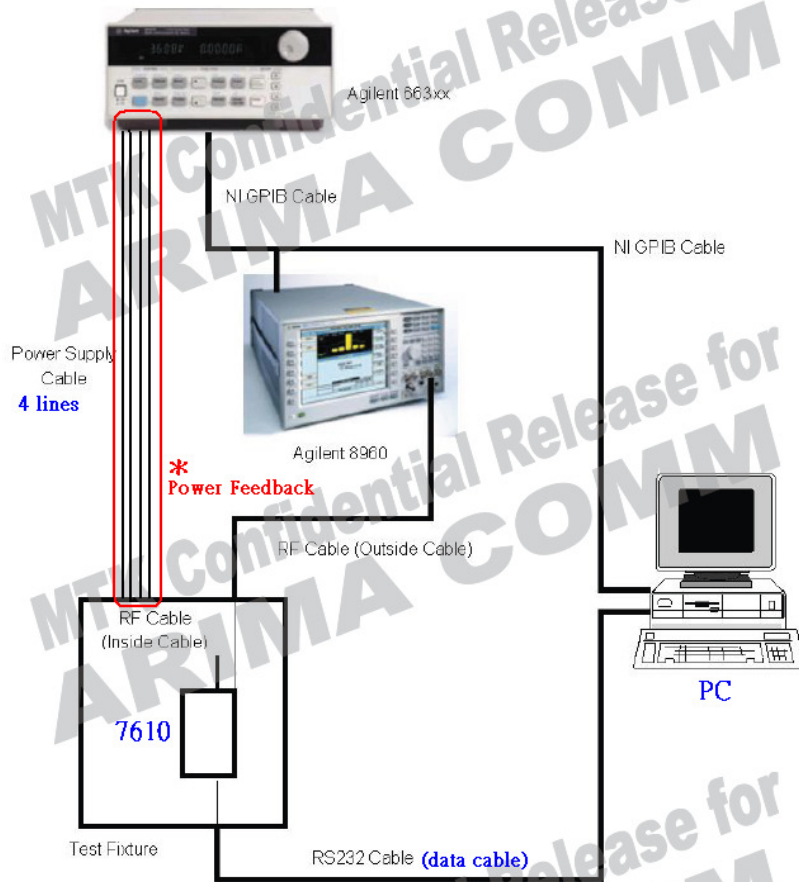
FL901

7-3. RF CALIBRATION / TEST TOOL (HMETA)

EQUIPMENTS TO BE PREPARED

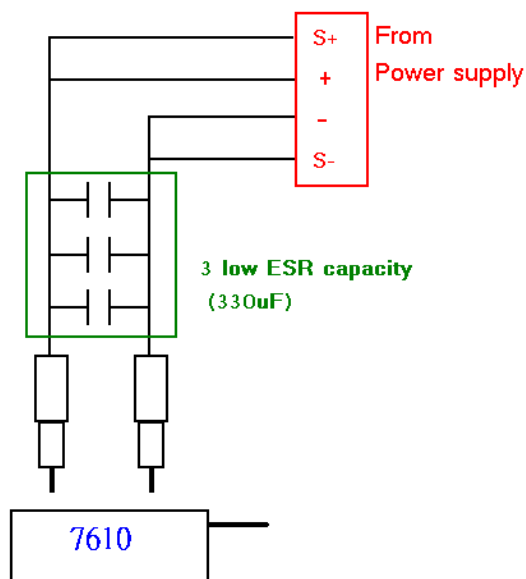
- IBM PC with Microsoft Windows 2000 or XP, 256MB RAM or above
- PCI GPIB card(with cable) or USB-to-GPIB cable
- Radio Communication Tester :
 - Agilent 8960 (firmware version 1960A or 1968A)
- DC Power Supply (supporting list as the following)
 - Agilent 661x or Agilent 663xx series power supply(recommanded)
 - R&S NGSM Power Supply
 - KEITHLEY 2303, 2304, 2306
 - Agilent 3631A power supply
 - Willtek WT4400 power supply option
- Others
 - 7339 RF power golden sample (with known power on each band and channel)
 - 7339 USB-to-RS232 cable
 - Dummy battery
 - RF Cable

EQUIPMENT SETUP



Remark 1 > Please use 4-wire connection (S+, S—, + and —) between power supply output and the DUT

Remark 2 > Please add 3 low ESR capacitors on the power terminals of DUT



HMETA INSTALLATION AND SETUP

This is a self-executing program, so installation is not needed. Please extract relative files to specified directories, this document use these directories as default for explanation

HMETA files : D:\7339_Cal_Release

Configuration files : D:\7339_Cal_config_file

Database file : D:\7339_database

1. Set cable loss

Open “ cable_loss.txt” in “ D:\7339_Cal_Release\common”

```
[Cal_CableLoss]
//*****
gsmtxloss1=0.500
gsmtxloss1=0.500
//
dcstxloss1=0.500
dcstxloss1=0.500
//
pcstxloss1=0.800
pcstxloss1=0.800
//
gsm850txloss1=0.800
gsm850txloss1=0.800
//*****

Cable loss setting for final test, value is negative

[FT_CableLoss]
channel          tx1_loss      rx1_loss
GSM_Ch1 =       975,      -0.500,      -0.500,
GSM_Ch2 =        37,      -0.500,      -0.500,
GSM_Ch3 =       124,      -0.500,      -0.500,
DCS_Ch1 =       512,      -0.500,      -0.500,
DCS_Ch2 =       700,      -0.500,      -0.500,
DCS_Ch3 =       885,      -0.500,      -0.500,
PCS_Ch1 =       512,      -0.800,      -0.800,
PCS_Ch2 =       660,      -0.800,      -0.800,
PCS_Ch3 =       810,      -0.800,      -0.800,
```

Use RF power golden sample to calculate cable loss, see appendix 1 behind this section for “HOW TO READ RF POWER FROM AG8960”

2. Apply equipment setting

Open “equipment_config.txt” in “D:\7339_Cal_Release\common”, parameter explanation as the following

```
[SETTING]
//Screen ON/OFF : 0->Off , 1->On (set the test screen On or Off)
screen_switch= 1
8960 GPIB Address=GPIB0::14::INSTR (set the GPIB address of AG8960)

//Power Supply (set the type and GPIB address of power supply)
//0 : 663xx , 1 :rs_ngsm , 2,3 : ke230x 5: hpe3631
Power Supply Type = 0
Power Supply Address=GPIB0::5::INSTR

[TEST_SETTING]

//0 : Cal , 1 : Final , 2 Cal&Final
(select whether calibration or final test should be performed)
DEFAULT_TEST_SELECT = 2
```

The other settings were optimized by experience, please use the default settings and do not change them.

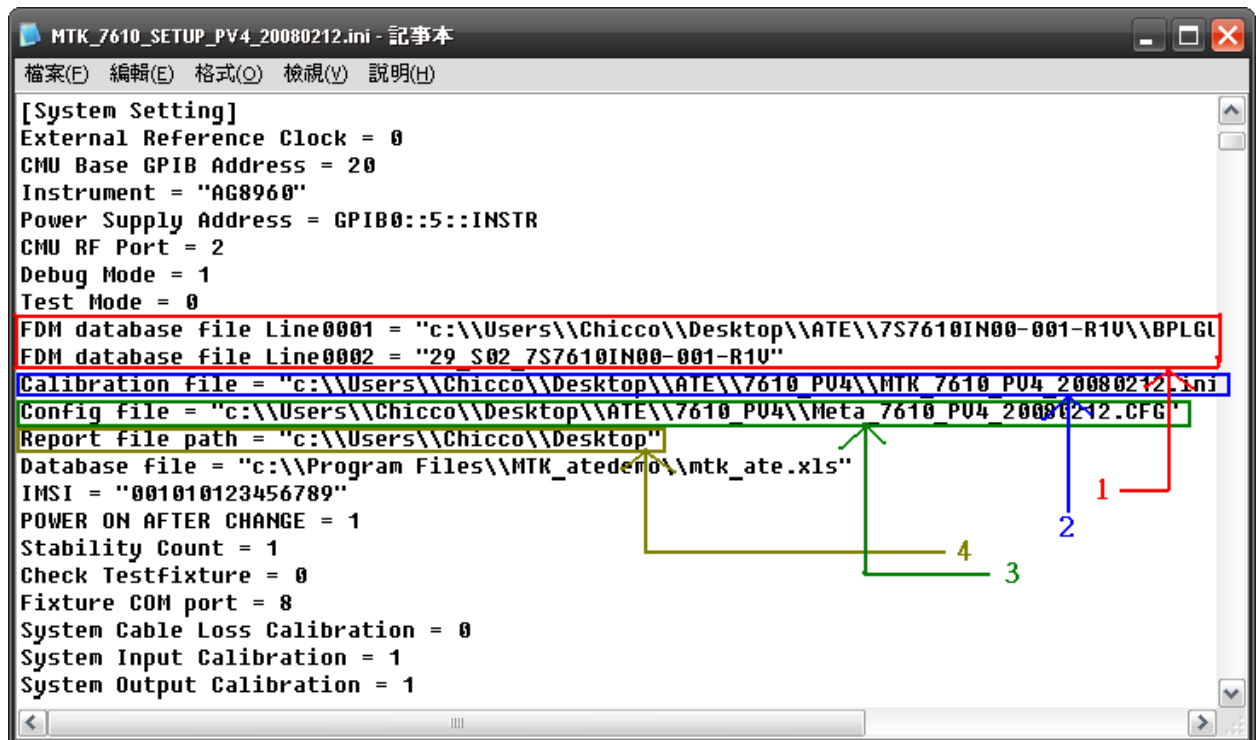
3. Set configuration files

Open “(7339_PP)MTK_6229_SETUP_0422.ini” in “D:\7339_Cal_config_file”, parameter explanation as the following

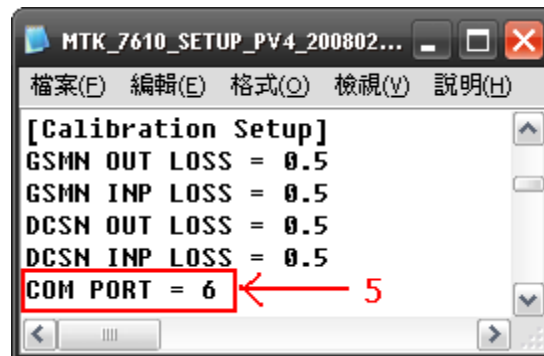
On the beginning of this file,

- [1] Set the file path of database (ex.
“D:\7339_database\BPLGUIInfoCustomAppSrcP_7S7339IN00-001-IND0422”).
- [2] Set the file path of Calibration file (ex.
“D:\7339_Cal_config_file\7339_PP)Meta_MT6139_SL1_0422.CFG”)
- [3] Set the file path of Config file (ex.
“D:\7339_Cal_config_file\7339_PP)MT6139_SKYWORKS_SL1_0422.ini”)
- [4] Set the path of log file (ex. “D:\7339_Cal_log”, calibration / final test logs will be stored in this directory)

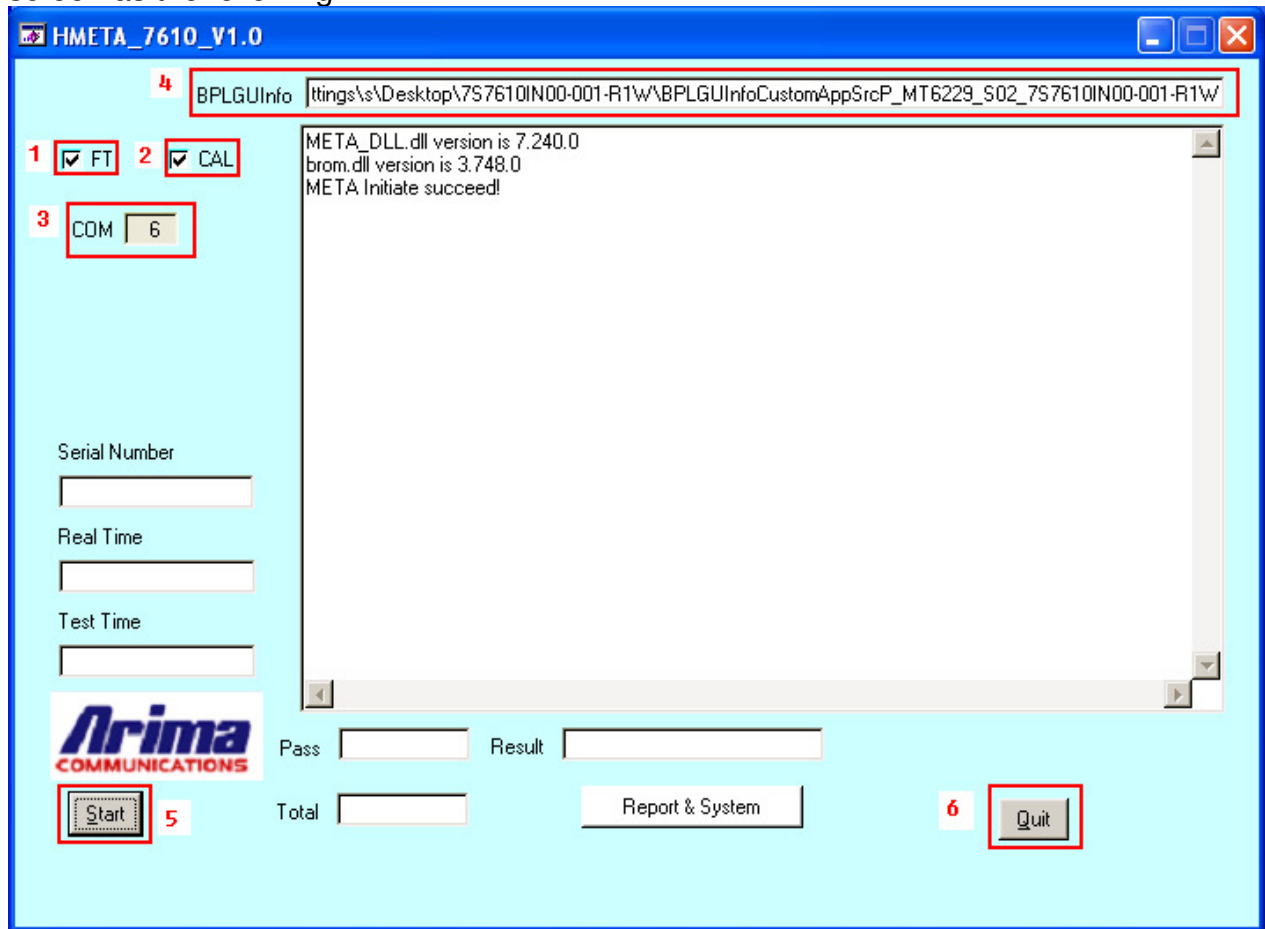
Note. Please use **double slash line “ \ ”** instead of single slash to set the file path



[5] Search " COM PORT =" and set the correct COM port number of PC

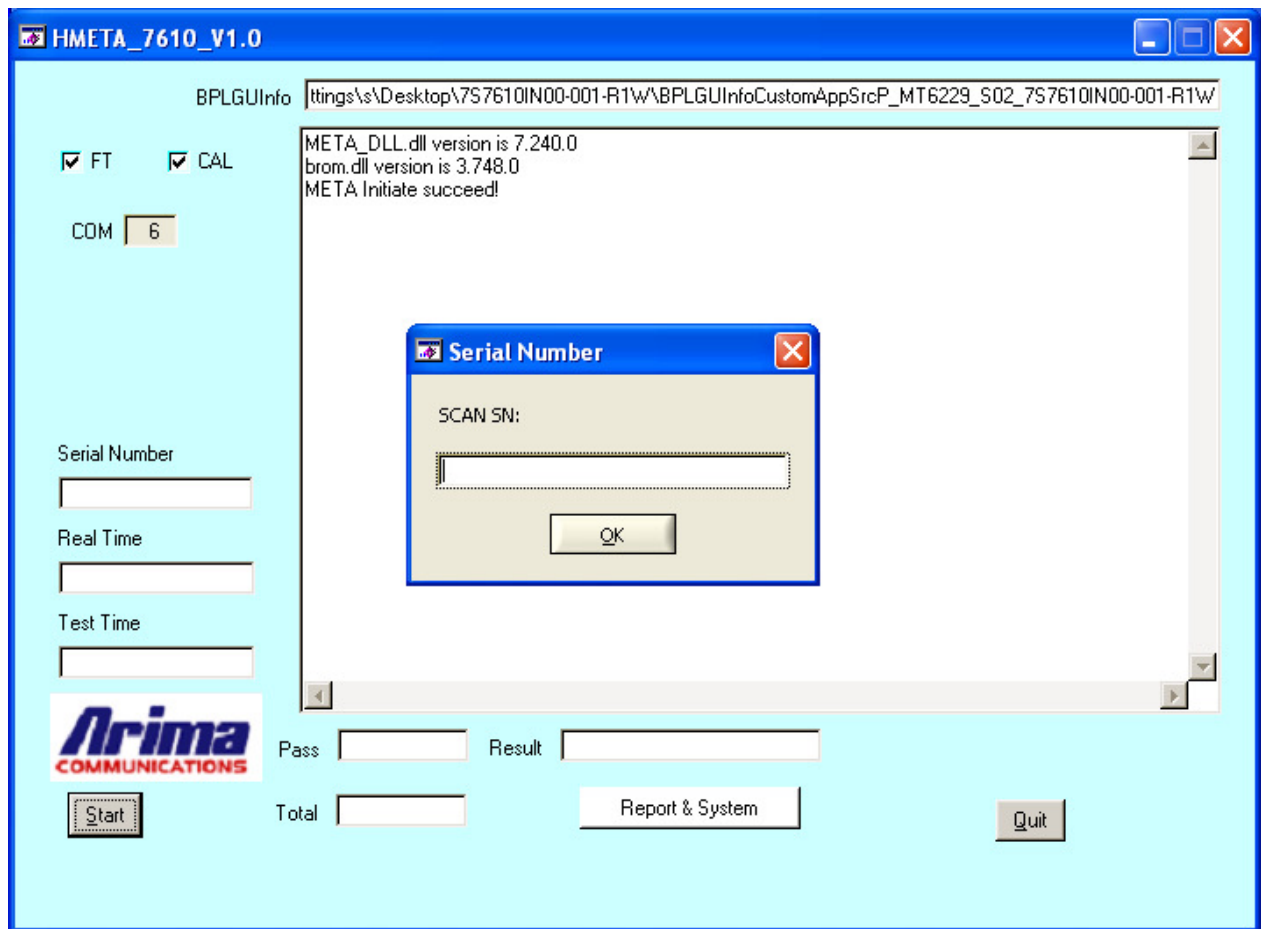


4. Double click D:\7339_Cal_Release\HMETA.exe to execute HMETA, the execution screen as the following



- [1] Select this item to do **Final Test**
- [2] Select this item to do **Calibration**
- [3] Check if **COM port** setting is correct
- [4] Check if the location of **Database** is correct
- [5] Press here to **START** calibration or final test
- [6] Press **Quit** to end this program

After pressing the **START** button, a pop up window will show up for serial number input. Please scan bar code or key in 16 digit bar code, then press OK to start calibration or final test



This figure show the RF calibration process

☒ FT
 ☒ CAL
 COM
 Serial Number

 Real Time

 Test Time

DAC1:4037,gain:25,Frequency offset:2
 Write the min tx afc offset 2 to NVRAM
 FreqErr_min:6.15,tx_afc_offset_min 2
 -----DCS1800 Band-----
 DAC1:4031,gain:25,Frequency offset:57
 DAC1:4035,gain:25,Frequency offset:38
 DAC1:4037,gain:25,Frequency offset:25
 DAC1:4038,gain:25,Frequency offset:27
 DAC1:4040,gain:25,Frequency offset:8
 Write the min tx afc offset 2 to NVRAM
 FreqErr_min:9.54,tx_afc_offset_min 2
 -----PCS1900 Band-----
 DAC1:4036,gain:25,Frequency offset:72
 DAC1:4041,gain:25,Frequency offset:30
 DAC1:4043,gain:25,Frequency offset:25
 DAC1:4044,gain:25,Frequency offset:14
 Write the min tx afc offset 4 to NVRAM
 FreqErr_min:9.46,tx_afc_offset_min 4
 ----- TX AFC offset calibration end -----
 APC Calibration time=19.45(sec)
 XO calibration pass!

This figure show the RF calibration pass

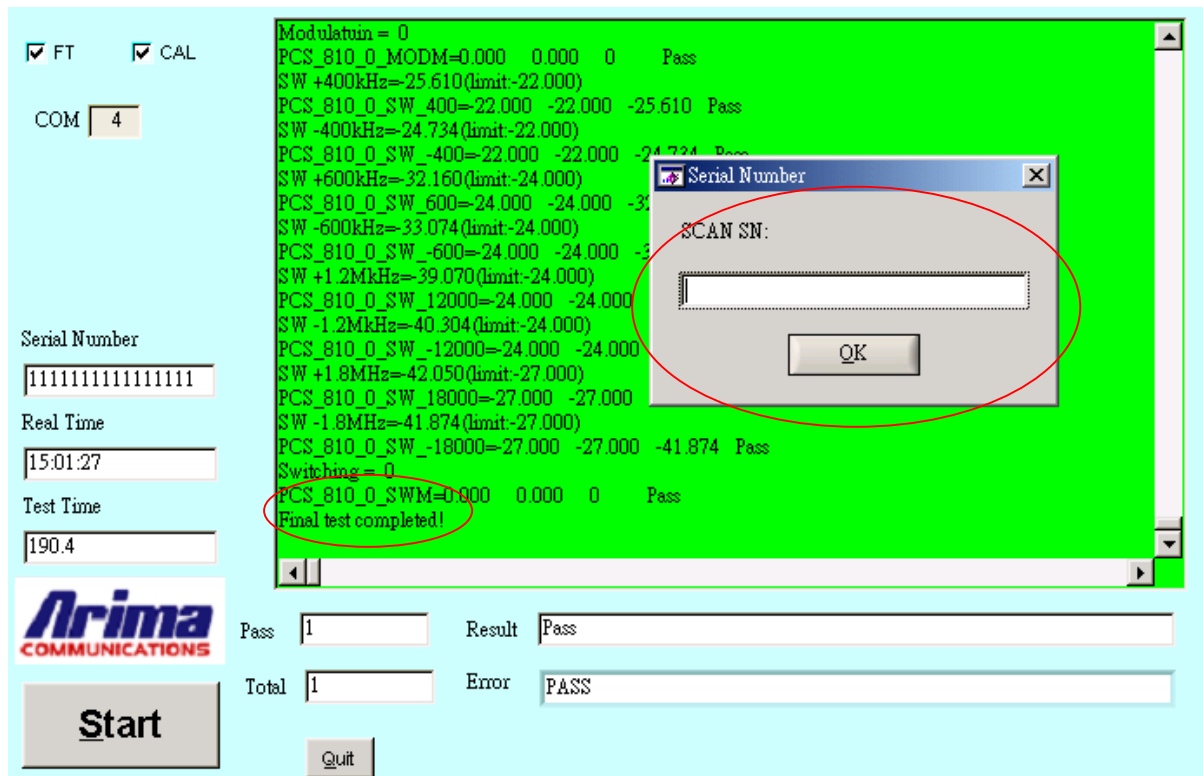
☒ FT
 ☒ CAL
 COM
 Serial Number

 Real Time

 Test Time

TX calibration pass!
 APC check pass!
 Battery Slope=5347 ADC offset=67787
 ,Charger Slope=5329 ADC offset=70964
 ADC Calibration Battery Slope Ok
 ADC Calibration Battery Channel Offset Ok
 ADC Calibration current difference 0.000772
 ADC Calibration current difference Ok
 ADC Calibration voltage difference 0.007813
 ADC Calibration voltage difference Ok
 ADC calibration pass!
 Board Calibration pass!
 ADC Calibration voltage difference Ok
 -----GSM/EDGE Cal Total Time = 60.99(sec) -----
 RF calibration pass!

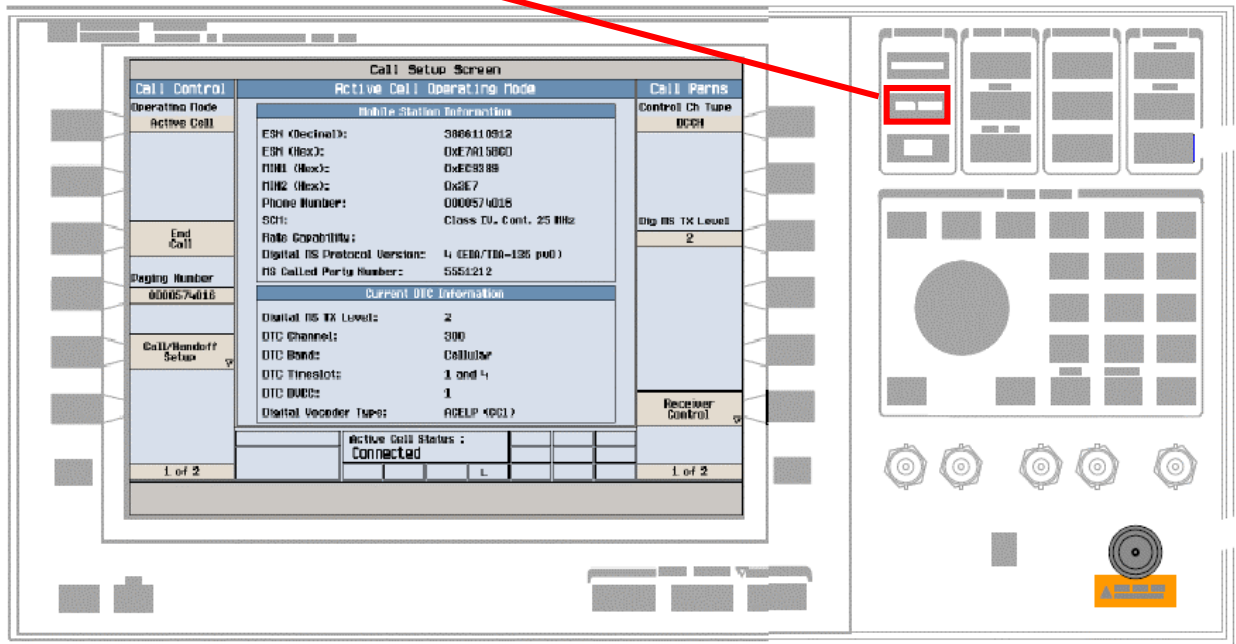
This figure show the “Final test completed”, and the picture color become green, Then pop up window show to input another serial number .



5. The following below explain how to set the cable loss when first time to apply calibration.

APPENDIX - HOW TO READ RF POWER FROM AG8960

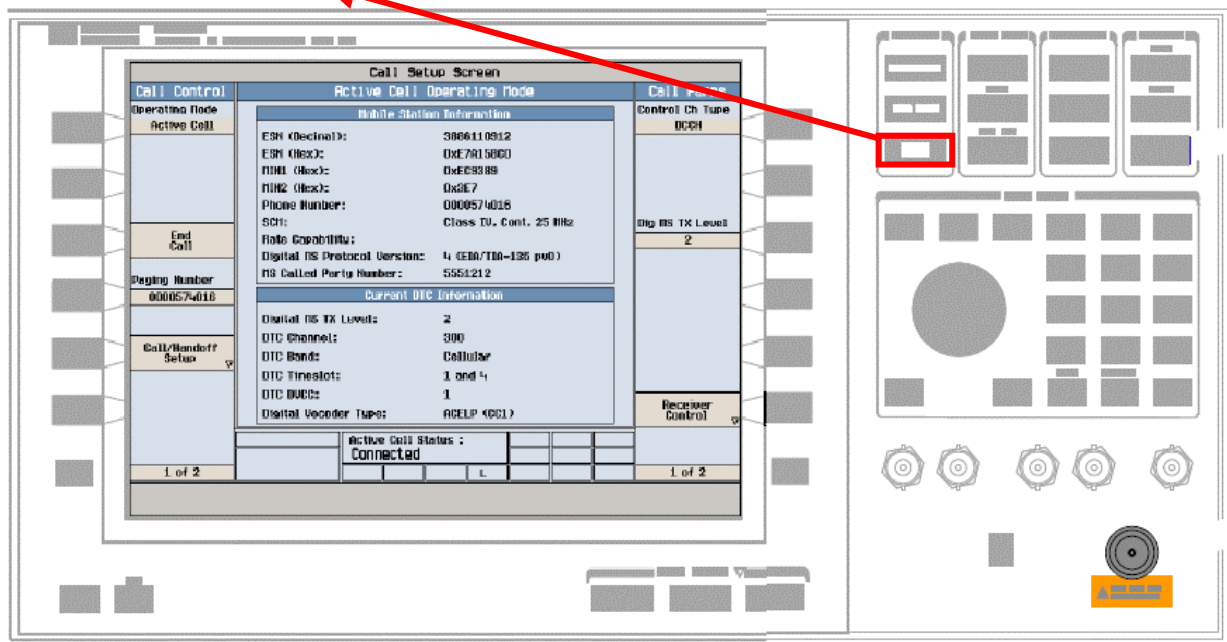
1. Press **CALL SETUP** button to enter Call Setup Screen



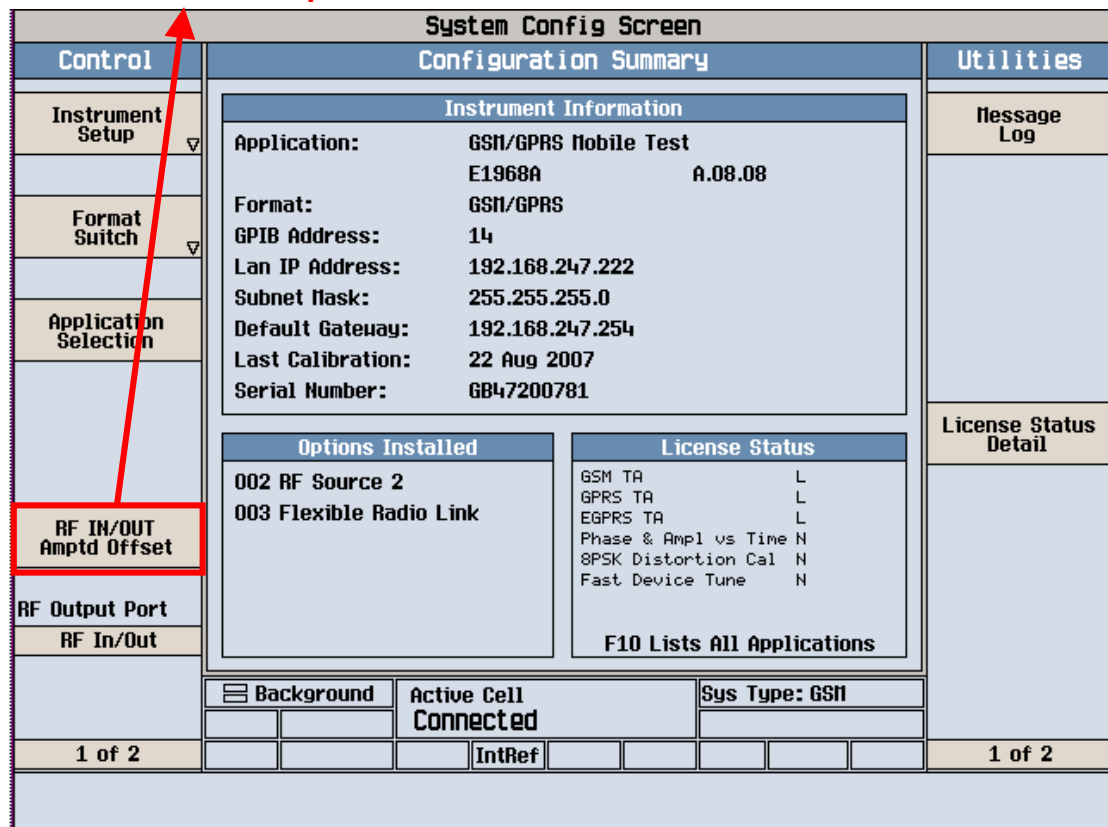
2. Press **Paging Parameters** and fill in **Paging IMSI Value**

Call Setup Screen			
Control	Call Setup		Call Params
Operating Mode	DUT Information		BCH Parameters
Active Cell	IMEI: 135790246811220	Page: 11	
	INSI: 001011234567890	RACH / PRACH: 2 / 0	
Data Conn Type	Called Num: ----	Missing Burst: 39	TCH Parameters
Auto	Last LAC: ----	Corrupt Burst: 0	
	Last MCC: ----	Decode Error: 0	
	Last MNC: ----		
End Call	Mslot Class GPRS: ----	DUT IP Tx Packets: ----	PDCH Parameters
	Mslot Class EGPRS: ----	DUT IP Tx Bytes: ----	
	DTX Class GPRS: ----	DUT IP Rx Packets: ----	
	Paging Parameters		Handover Parameters
	Paging IMSI	001011234567890	
	Paging Mode	Normal	
	Paging Multiframe	2	
	Repeat Paging	Off	
	Call Originate Timeout	10 s	
			Receiver Control
Close Menu	Background		
	Active Cell Connected		Sys Type: GSM
1 of 2	IntRef		

4. Press **SYSTEM CONFIG** button to set up cable loss



5. Press **RF IN/OUT Amptd** Offset to check cable loss



6. Press **RF IN/OUT Amptd Offset Setup** and Set the Value of RF IN/OUT Amptd Offset Setup to off (assume using short RF car-kit with 0db loss)

System Config Screen										
RF IN/OUT	RF IN/OUT Amplitude Offset						Utilities			
<div>RF IN/OUT Amptd Offset Setup ▾</div>	RF IN/OUT Amplitude Offset State: Off									
		Number	Frequency (MHz)	Offset (dB)						
		1	880.20	0.00						
		2	903.00	0.00						
		3	914.80	0.00						
		4	1710.20	0.00						
		5	1747.80	0.00						
		6	1784.80	0.00						
		7	1850.20	0.00						
		8	1879.80	0.00						
		RF IN/OUT Amplitude Offset Setup				Value				
		RF In/Out Amplitude Offset State				Off				
		Frequency 1				880.200 MHz				
		Offset 1				0.00 dB				
		Frequency 2				903.000 MHz				
		Offset 2				0.00 dB				
		Frequency 3				914.800 MHz				
		Offset 3				0.00 dB				
Close Menu		Frequency 4				1.71020 GHz				
		Background		Active Cell		Sys Type: GSM				
				Idle						
				IntRef						
						1 of 2				

7. Press **BCH Parameters** to set up BCH Params

Call Setup Screen									
Control	Call Setup						Call Params		
Operating Mode									
Active Cell	DUT Information						Counters		
	IMEI: 135790246811220						Page: 11		
	MSIS: 001011234567890						RACH / PRACH: 2 / 0		
Data Conn Type	Called Num: ----						Missing Burst: 39		
Auto	Last LAC: ----						Corrupt Burst: 0		
	Last MCC: ----						Decode Error: 0		
	Last MNC: ----								
Originate Call	Hslot Class GPRS: ----						DUT IP Tx Packets: ----		
	Hslot Class EGPRS: ----						DUT IP Tx Bytes: ----		
	DTM Class GPRS: ----						DUT IP Rx Packets: ----		
	DTM Class EGPRS: ----						DUT IP Rx Bytes: ----		
	Traffic Channel Downlink Power								
	Burst:	1	2	3	4	5	6	Adj	
	dBm:	----	----	----	----	----	----	----	
Paging Parameters ▾	Error Reports								
	Burst Timing Error: ---- T								
	BLER (Block Error Rate): ---- % over ---- blocks								
	USF BLER (Assigned): ---- % over ---- blocks								
Cell Info	USF BLER (Unassigned): ---- % over ---- blocks								
	Background		Active Cell		Sys Type: GSM				
			Idle						
			IntRef						
1 of 2									
<div>BCH Parameters</div> <div>TCH Parameters</div> <div>PDCTCH Parameters</div> <div>Handover Parameters</div> <div>Receiver Control ▾</div>									

8. Check **Cell Power** is **-60dbm** and then press **Cell Band**

Call Setup Screen									
Control	Call Setup							BCH Params	
Operating Mode								Cell Power	
Active Cell								-60.00	dBm
Data Conn Type								Cell Band	
Auto								EGSM	
End Call								Broadcast Chan	
								32	
Paging Parameters								Return	
Cell Info									
1 of 2									

Traffic Channel Downlink Power							
Burst:	1	2	3	4	5	6	Adj
dBm:	-60.00	----	----	----	----	----	----

Error Reports			
Burst Timing Error:	0.50 T		
BLER (Block Error Rate):	----	% over	---- blocks
USF BLER (Assigned):	----	% over	---- blocks
USF BLER (Unassigned):	----	% over	---- blocks

Background		Active Cell		Sys Type: GSM	
		Connected			
		IntRef			

- 9 Select the Cell band we wanted

Call Setup Screen									
Control	Call Setup							BCH Params	
Operating Mode								Cell Power	
Active Cell								-60.00	dBm
Data Conn Type								Cell Band	
Auto								EGSM	
Originate Call								Broadcast Chan	
								32	
Paging Parameters								Return	
Cell Info									
1 of 2									

Cell Band							
Burst:	1	PGSM				6	Adj
dBm:	----	EGSM				----	----
		DCS					
		PCS					
		GSM					
		GSM450					

Background		Active Cell		Sys Type: GSM	
		Idle			
		IntRef			

10. Press **TCH Parameters** to set up TCH Parms

Call Setup Screen									
Control		Call Setup						Call Parms	
Operating Mode	Active Cell	DUT Information				Counters		BCH Parameters	
		IMEI: 135790246811220				Page: 11			
		IMSI: 001011234567890				RACH / PRACH: 2 / 0			
Data Conn Type	Auto	Called Num: ----				Missing Burst: 39		TCH Parameters	
		Last LAC: ----				Corrupt Burst: 0			
		Last MCC: ----				Decode Error: 0			
		Last MNC: ----							
	Originate Call	Mslot Class GPRS: ----				DUT IP Tx Packets: ----		PDPTCH Parameters	
		Mslot Class EGPRS: ----				DUT IP Tx Bytes: ----			
		DTM Class GPRS: ----				DUT IP Rx Packets: ----			
		DTM Class EGPRS: ----				DUT IP Rx Bytes: ----			
		Traffic Channel Downlink Power							
		Burst:	1	2	3	4	5	6	Adj
		dBm:	----	----	----	----	----	----	----
Paging Parameters		Error Reports							
		Burst Timing Error: ---- T							
		BLER (Block Error Rate): ---- % over ---- blocks							
		USF BLER (Assigned): ---- % over ---- blocks							
		USF BLER (Unassigned): ---- % over ---- blocks							
Cell Info									
		Background		Active Cell		Sys Type: GSM			
				Idle					
1 of 2					IntRef				

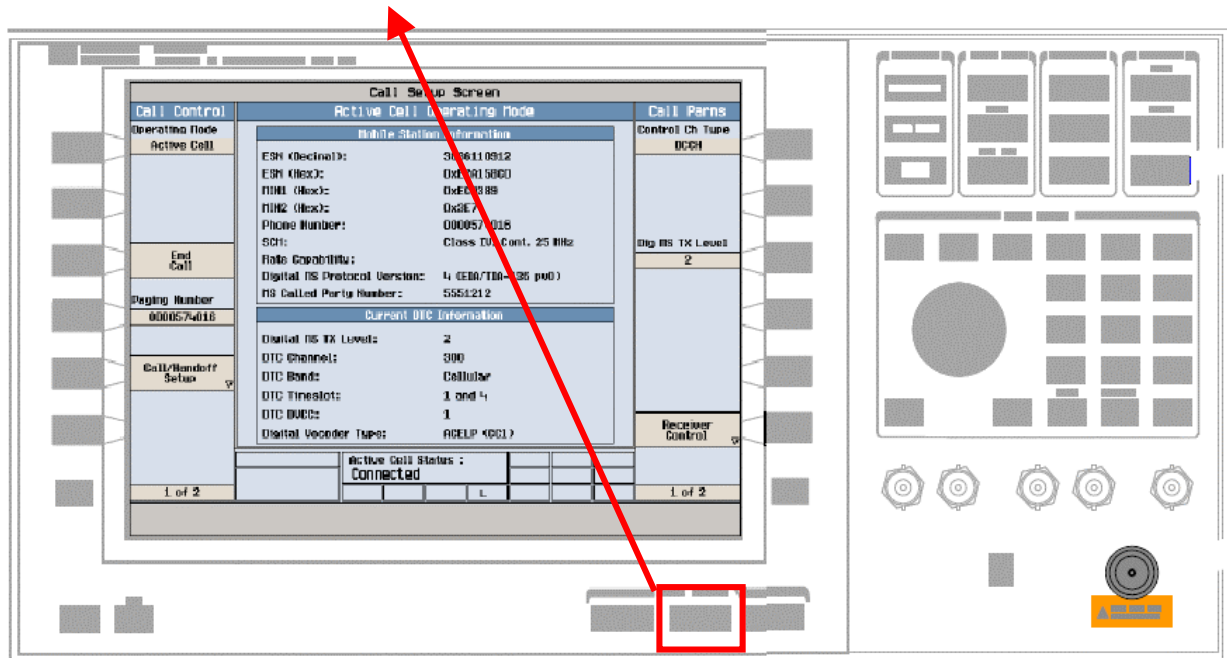
11. Set **Traffic Band, Traffic Channel and MS TX Level** to the wanted values(GSM=5, DCS=0, PCS=0)

Call Setup Screen									
Control		Call Setup						TCH Parms	
Operating Mode	Active Cell	DUT Information				Counters		Downlink Traffic Power	
		IMEI: 135790246811220				Page: 11			
		IMSI: 001011234567890				RACH / PRACH: 2 / 0			
Data Conn Type	Auto	Called Num: ----				Missing Burst: 39		Traffic Band	
		Last LAC: ----				Corrupt Burst: 0		EGSM	
		Last MCC: ----				Decode Error: 0			
		Last MNC: ----							
	End Call	Mslot Class GPRS: ----				DUT IP Tx Packets: ----		Traffic Channel	
		Mslot Class EGPRS: ----				DUT IP Tx Bytes: ----		65	
		DTM Class GPRS: ----				DUT IP Rx Packets: ----		MS TX Level	
		DTM Class EGPRS: ----				DUT IP Rx Bytes: ----		5	
		Traffic Channel Downlink Power							
		Burst:	1	2	3	4	5	6	Adj
		dBm:	-60.00	----	----	----	----	----	----
Paging Parameters		Error Reports							
		Burst Timing Error: 0.50 T							
		BLER (Block Error Rate): ---- % over ---- blocks							
		USF BLER (Assigned): ---- % over ---- blocks							
		USF BLER (Unassigned): ---- % over ---- blocks							
Cell Info									
		Background		Active Cell		Sys Type: GSM			
				Connected					
1 of 2					IntRef				

12. Connect RF carkit to handset, power on the handset. Press **Originate Call** to connect to the handset

Call Setup Screen									
Control	Call Setup							TCH Params	
Operating Mode	DUT Information							Downlink Traffic Power	
Active Call	Counters							Traffic Band	
Data Conn Type	Burst Timing Error:							EGSM	
Auto	BLER (Block Error Rate):							Traffic Channel	
	USF BLER (Assigned):							65	
	USF BLER (Unassigned):							MS TX Level	
	Background							5	
	Active Cell							Channel Mode Setup	
	Idle							Return	
	Sys Type: GSM								
1 of 2	IntRef							1 of 2	

13 Press **Measurement Selection** button to select test items

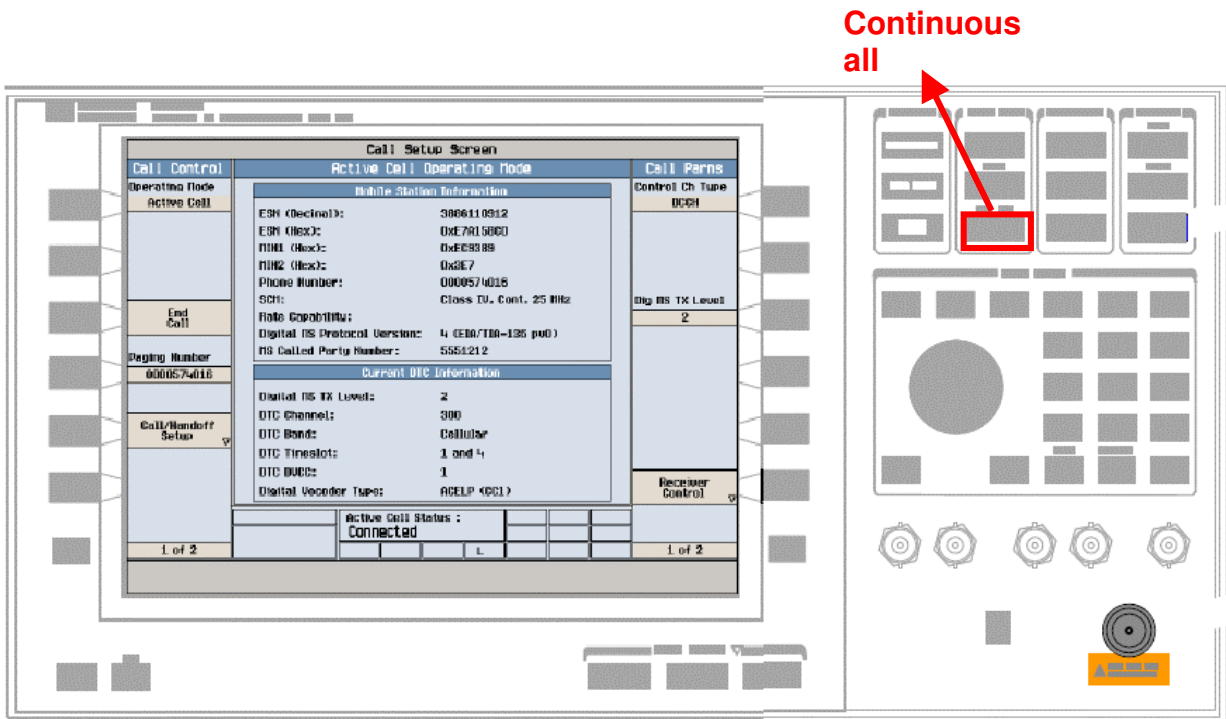


14 Select Transmit Power

Call Setup Screen									
Control		Call Setup						Call Params	
		DUT Information				Counters		BCH Parameters	
		IMEI: 135790246811220				Page: 11			
		IMSI: 001011234567890				RACH / PRACH: 2 / 0			
		Called Num: ----				Missing Burst: 39		TCH Parameters	
		Last LAC: ----				Corrupt Burst: 0			
		Last MCC: ----				Decode Error: 0			
Close Measurement		Last MNC: ----							
		Hslot Class GPRS: ----				DUT IP Tx Packets: ----			
		Hslot Class EGPRS: ----				DUT IP Tx Bytes: ----		PDCH Parameters	
		DTH Class GPRS: ----				DUT IP Rx Packets: ----			
		Loc Measurement Selection							
		<div> <div>Transmit Power</div> <div>Power vs Time</div> <div>Phase & Frequency Error</div> <div>EGPRS Modulation Accuracy</div> <div>Output RF Spectrum</div> <div>IQ Tuning</div> <div>GSM Fast Bit Error</div> <div>GSM Bit Error</div> </div>						Handover Parameters	
Close Menu								Receiver Control	
		Background		Active Cell Connected			Sys Type: GSM		
				IntRef					

15 Press **Continuous all** and check **Burst Power**

Measurement/Instrument Screen												
Control		Transmit Power							Call Params			
Transmit Power Setup ▾							Burst 1	Burst 2	Burst 3	Burst 4	BCH Parameters	
		Burst Power		Average	32.76	----	----	----	----			
				Std. Dev.	0.00	----	----	----	----			
		Estimated Carrier Power		Average	32.76	----	----	----	----			
				Std. Dev.	0.00	----	----	----	----			
		15 / 15							Continuous			
											PDTCCH Parameters	
											Handover Parameters	
		1 of 2				Active Cell Connected			Sys Type: GSM			
				IntRef								



7-4. SOFTWARE DOWNLOAD TOOL

EQUIPMENTS TO BE PREPARED

- IBM PC with Microsoft Windows 2000 or XP, 256MB RAM or above
- 7339 USB-to-RS232 cable

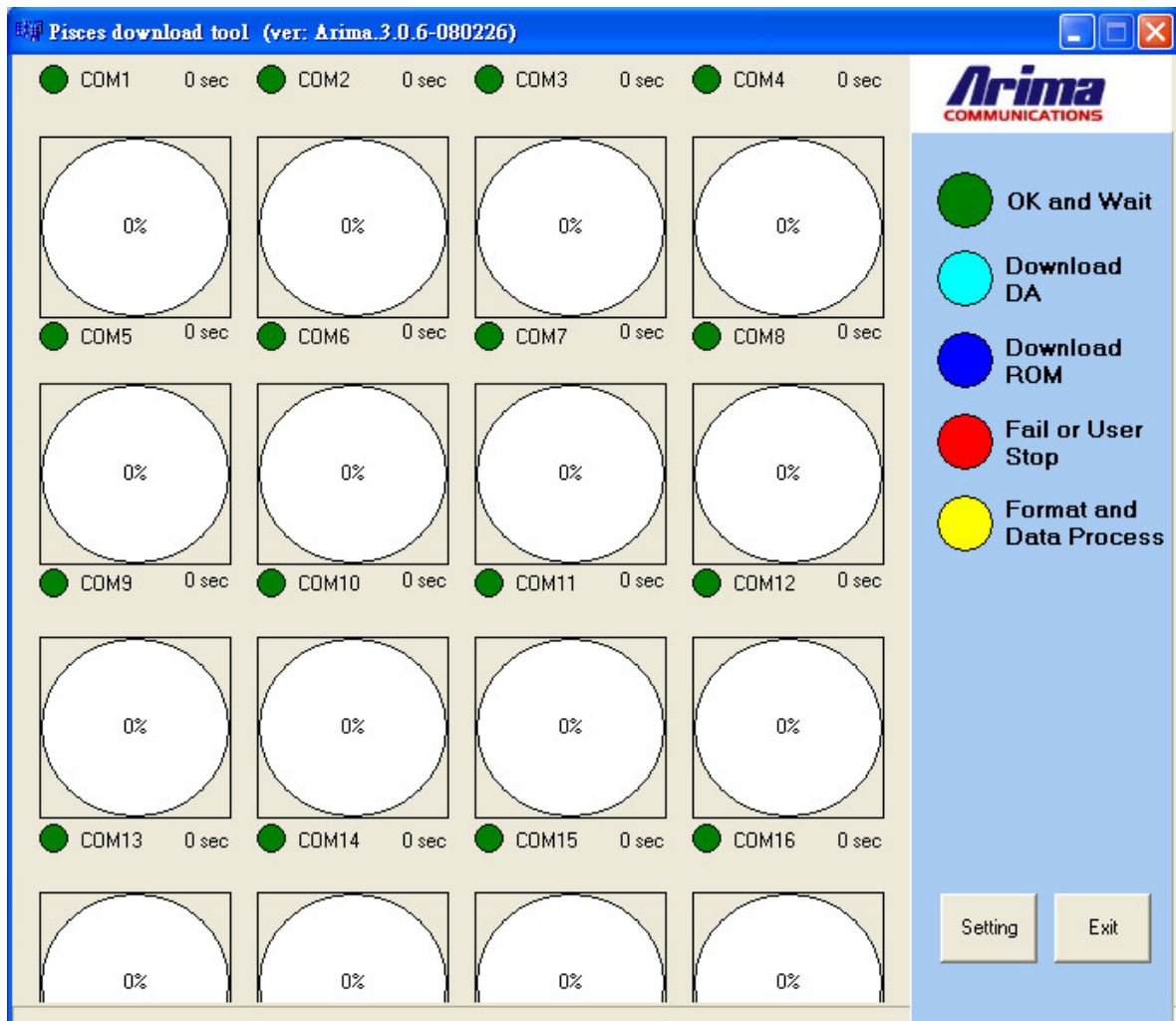
PCS TOOL INSTALLATION AND SETUP

This is a self-executing program, so installation is not needed. Please extract PCS TOOL and 7339 download file to specified directories, this document use these directories as default for explanation

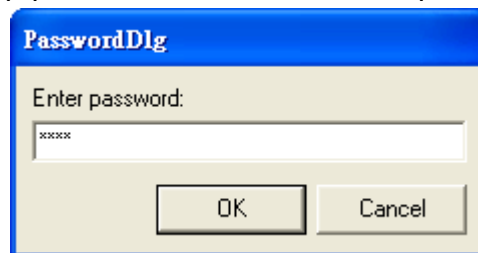
PCS TOOL : D:\PCS_Tool_3.0.6_080226

7339 download file : D:\7339_database\ 7S7339IN00-001-IND0422.pcs

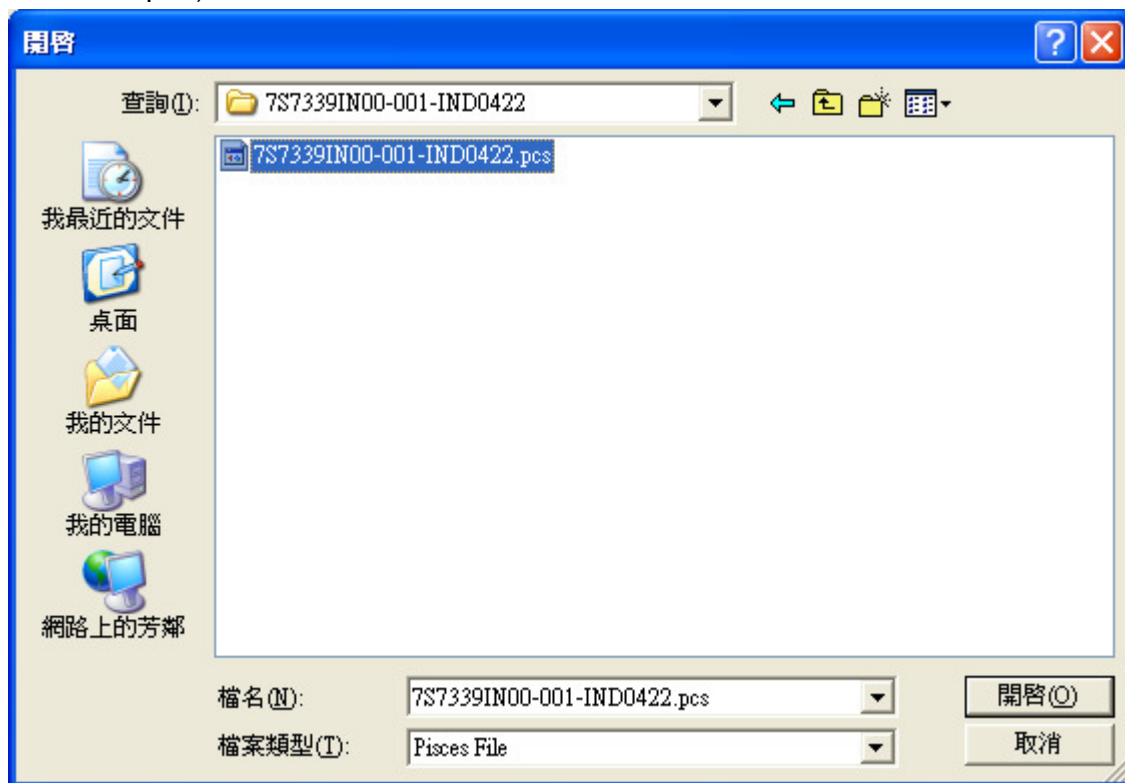
1. Double click D:\PCS_Tool_3.0.6_080226\ Pisces.exe to open PCS TOOL



2. Press Setting to setup parameters of PCS TOOL, password is “1234”

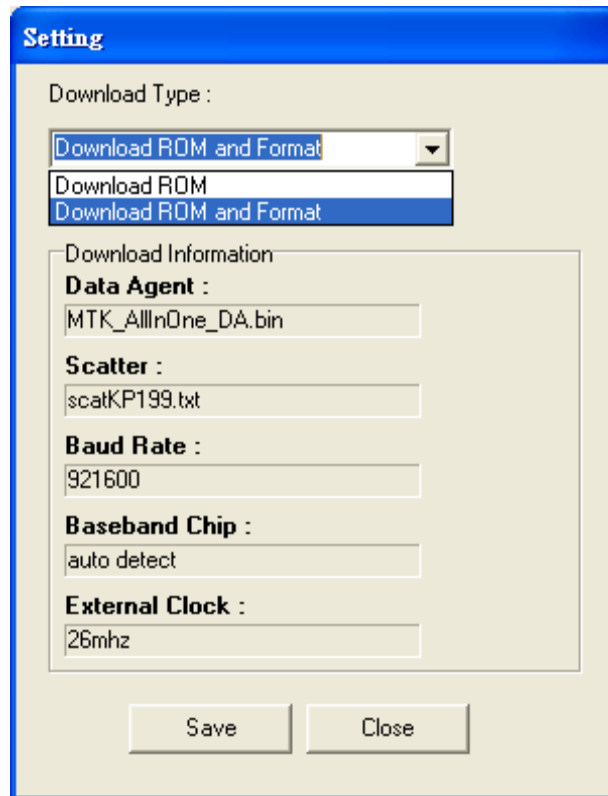


3. set the file path of 7339 download file (ex. D:\7339_database\ 7S7339IN00-001-IND0422.pcs)

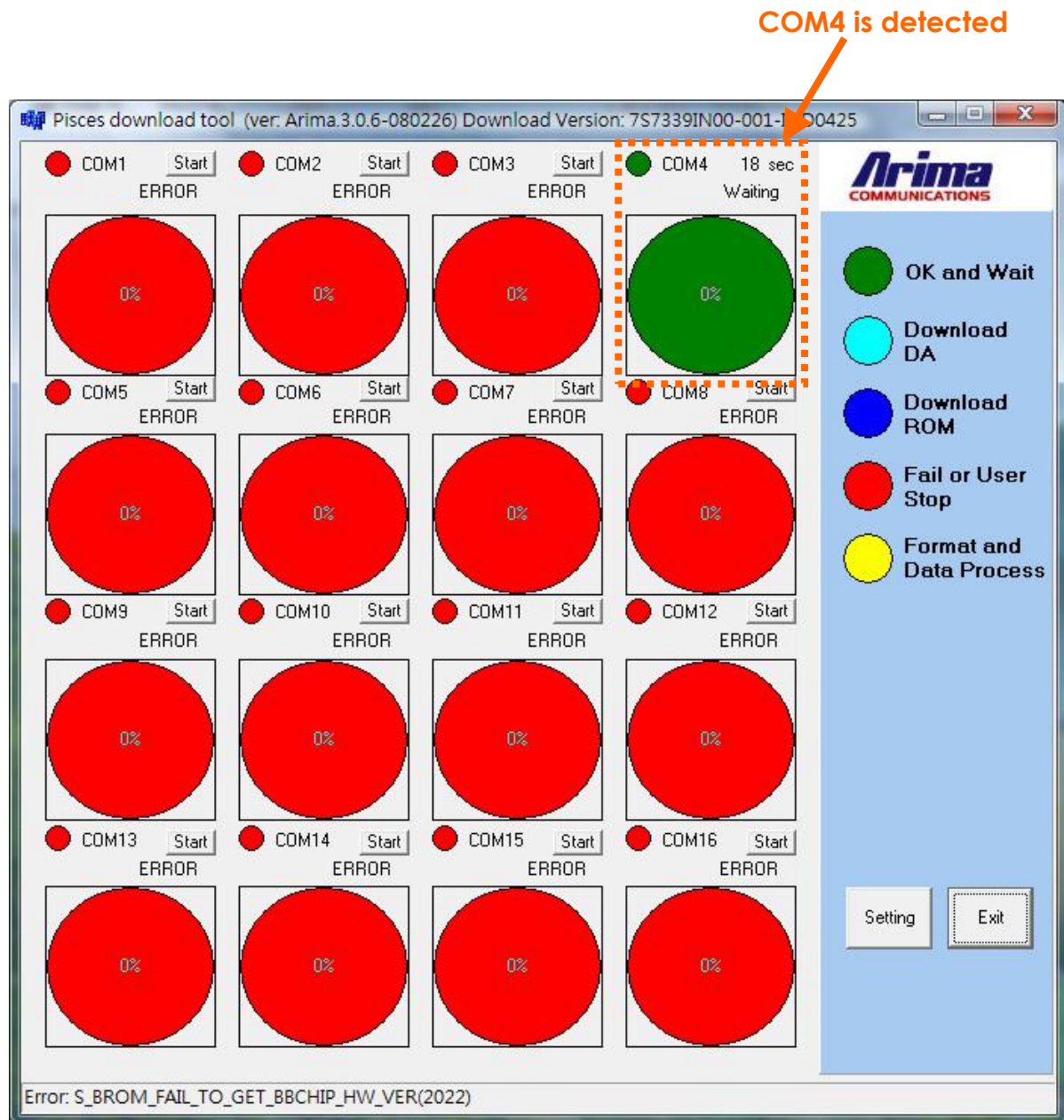


after the download file has been loaded, a pop up window shows up and user can select whether to format the flash or just download the software without format

Note. Select "Download ROM and Format" will clear RF calibration data, RF calibration is needed in this case

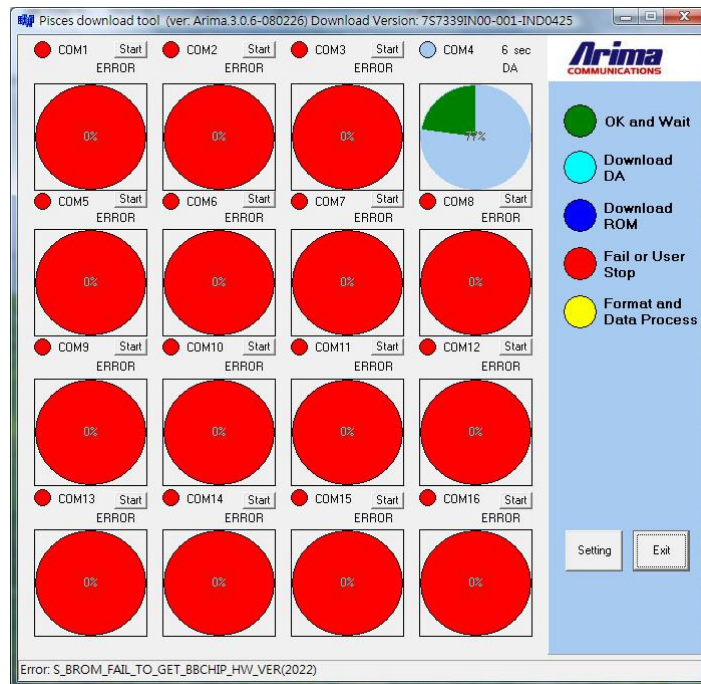


4. The program main window as the following, all available COM ports are automatically detected by the program, and a green circle is shown if a COM port is detected



5. Connect cable to 7339 then press the power key, download should start immediately as the following, please wait for about 6 minutes to finish download process

Download DA (download agent) :



Download the software :

